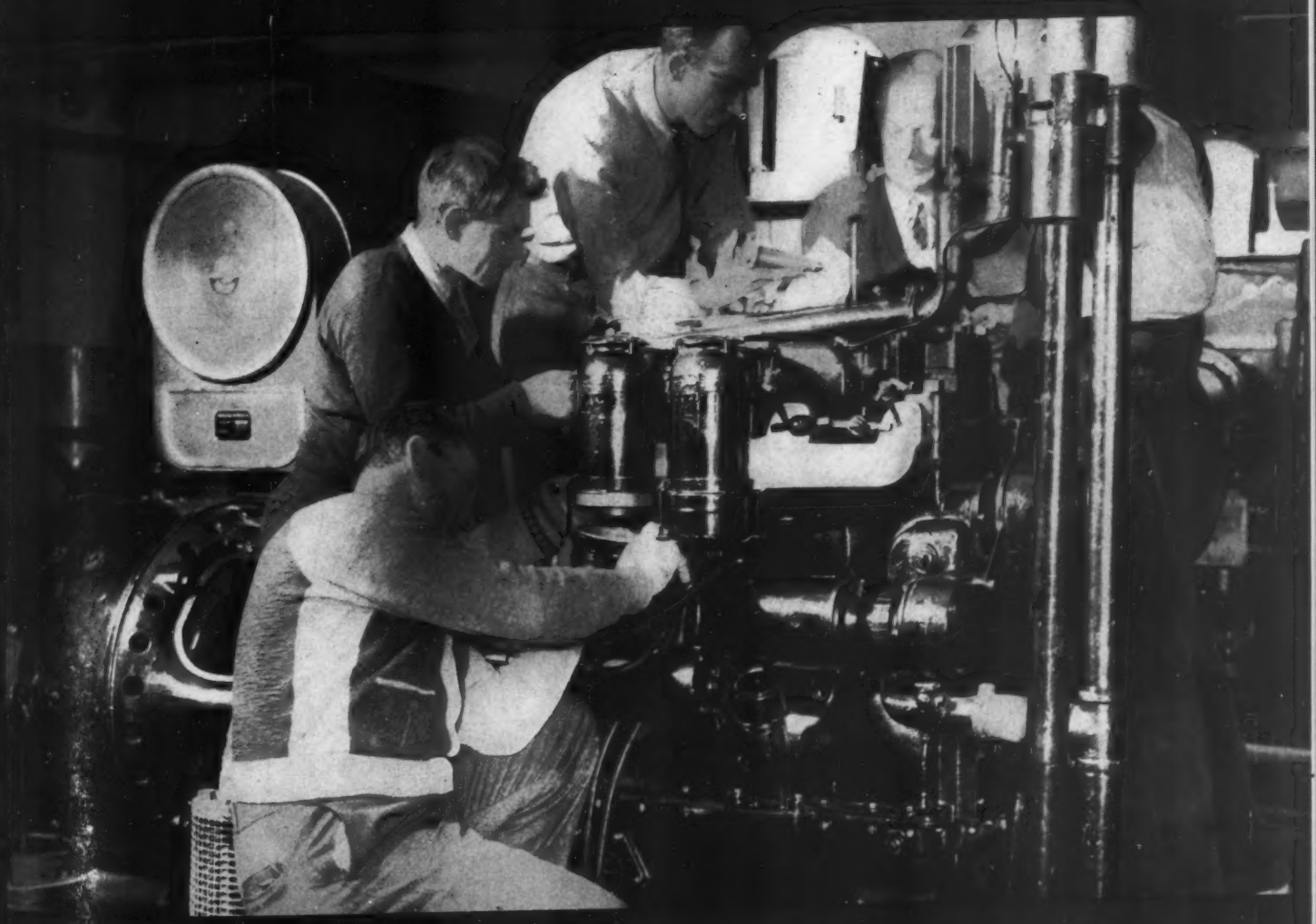
# Industrial Arts and VOCATIONAL EDUCATION



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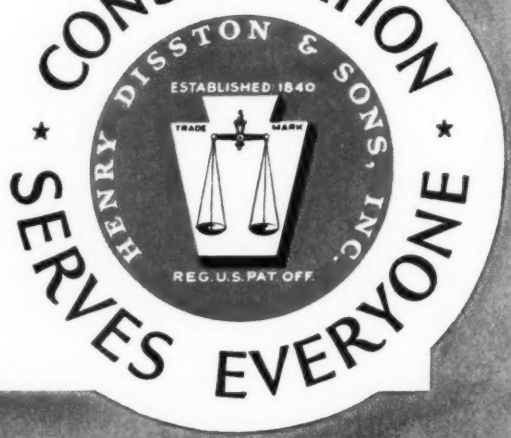


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**438 Tacony, Phila., Pa., U. S. A.**

# INDUSTRIAL ARTS *and* VOCATIONAL EDUCATION

VOL. 31 APRIL, 1942 Number 4

## IN THIS ISSUE

Those bearing the responsibility of giving in-service training to the many tradesmen who are engaged in preparing the workers needed for our present war-production efforts will, no doubt, find many valuable pointers in the first installment of John R. Patlow's article in this issue.

Stanley J. Pawelek and Noel B. Grinstead bring a real message to all teachers of the practical subjects. William J. Micheels' article, "State Supervision of Industrial Arts Education," is concluded in this number.

Teachers of printing will, no doubt, derive considerable benefit from the contributions made by R. Randolph Karch and E. K. Whitesitt.

The articles by Homer C. Rose and Garrott Barich also deserve attention.

Besides those already mentioned, there are a number of excellent contributions listed under Problems and Projects for the teachers of woodwork, metalwork, and machine-shop practice.

## THIS MONTH'S COVER

The picture chosen for the April cover of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION was among those submitted by John R. Patlow with his article entitled "In-Service Instructor Training for War Production," the first installment of which appears on page 141.

The picture shows trainees working on a Diesel engine.

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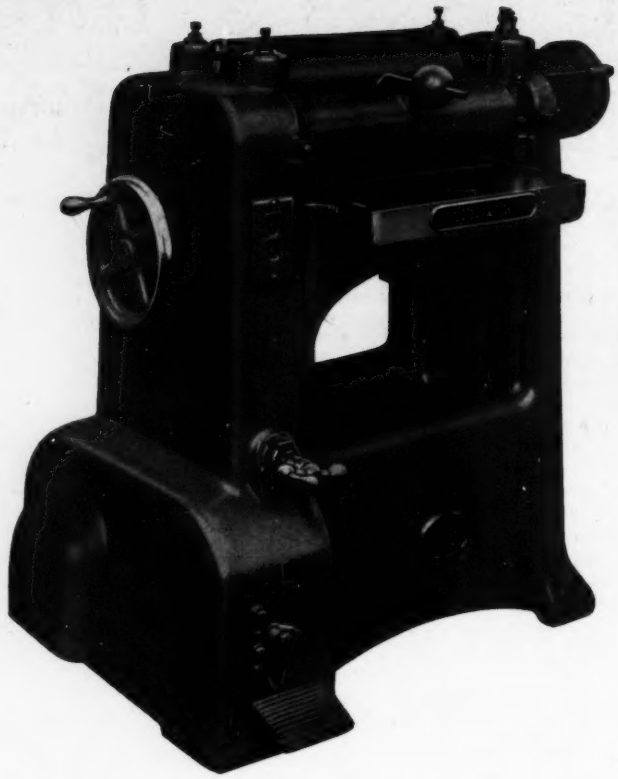

# J-18 SURFACER

VARIABLE speed feed control . . . fully enclosed construction . . . a heavy, one-piece frame . . . these are but a few of the many features that recommend the J-18 Surfacer for school shop installations. Feed rates from 15 to 45 feet per minute are obtained by turning a convenient hand crank located at the front of the machine. Nothing could be simpler and it is entirely safe, even in the hands of the inexperienced and the incautious. The speed necessary to produce a high quality finish on hard or soft wood is instantly available with this drive.

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In addition to the surfacer illustrated, Yates-American manufactures an extensive line of other woodworking machines for vocational training. It is also actively engaged now in the production of woodworking equipment for the nation's armed forces and many war industries.

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## Short Talks on Wood

RED PINE (*Pinus resinosa*)

Primarily a tree of the northern woods. Also known as Norway pine and hard pine. Wood is similar to white pine, but is somewhat heavier, stronger, coarser in texture and more resinous. Light, strong, hard and close-grained. Seasons well, works easily and takes a fine finish. Pale red in color.

Its uses are similar to those of white pine. Well suited for bridge and building timbers, masts, piling, interior finish, sash, doors and boxes.

Has general distribution throughout the Great Lakes region but reaches its greatest growth in northern Michigan, Minnesota and Wisconsin. Usually found on light, sandy soil. Its comparatively rapid growth and resistance to disease and insect attack makes it a desirable tree for reforestration planting.

In the forest it develops a tall, straight trunk clear of branches with a short, broad open crown. Attains a height of 60-80 feet and a diameter of 2 to 3 feet. Has a deep, spreading root system.

The bark is thick, reddish-brown and is divided into broad, flat ridges by shallow furrows. Peels off into thin scales. The leaves or needles grow in clusters of two, are straight, flexible, dark green and 5 to 6 inches long. Remain on the tree from 3 to 5 years. The fruit is an egg-shaped cone about 2 to 3 inches long. Cone-scales are without spines or prickles. Mature in the fall of the second year. The small winged seeds are widely borne by the wind.

*To date, thirty-four brief articles similar to the one above and dealing with the more commonly used woods have appeared in these ads. As in the past, we continue to invite your suggestions as to the species of wood you would like featured in this series.*

YATES-AMERICAN

# INDUSTRIAL ARTS *and* VOCATIONAL EDUCATION

## In-Service Instructor Training for War Production

JOHN R. PATLOW*

Industry needs trained workers. Time and speed are important factors in providing mechanics to keep the production lines operating continuously. War materials and equipment must flow steadily to the different branches of the armed forces. Since tradesmen have been drawn from industry to serve as instructors, it follows that these men should master teaching methods to instruct learners. The training of workers for the war-production industries will function more effectively if these new instructors are taught to break in green workmen and to coach those who need additional training. The answer to this need is an adequate in-service instructor training program.

### A Survey of the War-Service Training Program

Priorities have given us a new depression in many industries. Many plants have been shut down because the country is in the process of converting their facilities from normal to wartime production. The school steps in at this point to retrain thousands of dislocated workmen. The vocational schools of the country have reorganized their programs on a training station basis. The basic objective underlying training for the war-production program demands that learners be given instruction on training stations which meet the requirements for specific pay-roll jobs. Changes must be effected as rapidly as possible in the use of instruction procedures which will make it possible to train learners in much shorter periods of time. Standards will also have to be developed to require trainees to meet certain specifications during the training period so that replacements can be made from the waiting lists of persons who are eligible to enroll.

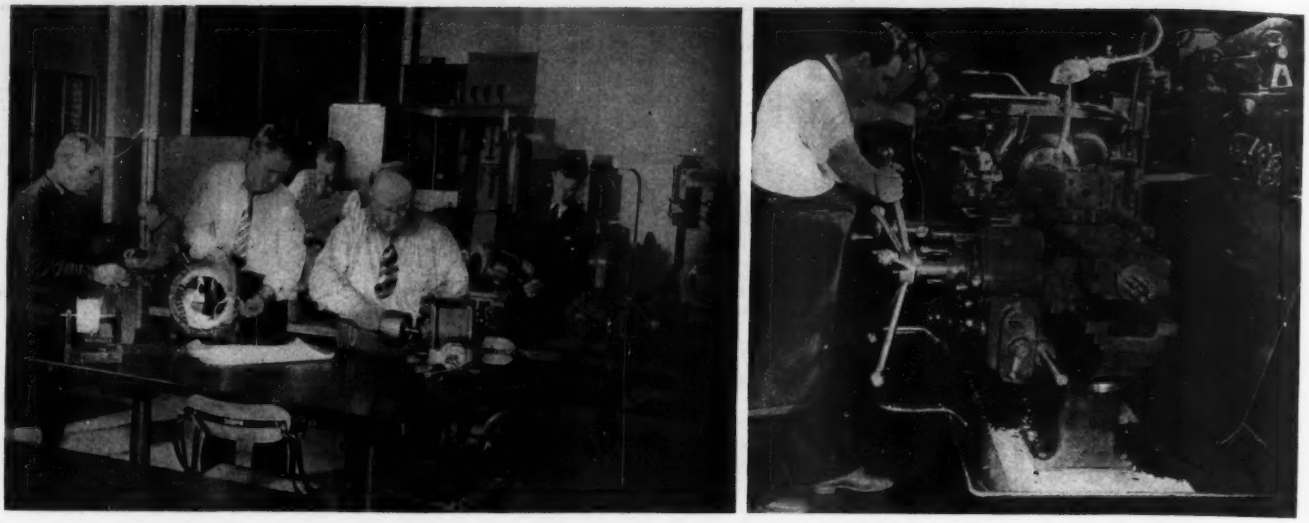
The training of workers for the war-production industries is administered under two categories, as provided for in the national program:

1. *Supplementary:* Supplementary courses are offered to those persons who are employed on specific pay-roll jobs vital to war-production industries and which have for their objectives:
   - *a*) To increase the productive skills of workers.
   - *b*) To provide essential technical knowledge which is necessary to do the work on the job.

For example, a machinist or a machine operator, is eligible to receive training on such training stations as will result in improving his skills. In addition, he is eligible to enroll in related technical courses in blueprint reading, shop mathematics, and the use of precision instruments. A molder, in the program, is qualified to take a course in any one of the following training stations: floor molding, bench molding, cupola tending, coremaking, metallurgy, and electric-furnace operation. If the instruction is directly related to the improvement of the work on the pay-roll job as provided in the OPM list of occupations, he meets the specifications. The minimum amount

*Vice-Principal, Milwaukee Vocational School, Milwaukee, Wis.

E. H. Rosenberg, instructor, demonstrating to a class of instructors how to teach



VEND students in the electrical and machine shops

of training recommended, in the releases of the United States Office of Education, to complete the courses in the supplementary category is 90 hours.

2. *Pre-employment:* Pre-employment courses are offered to NYA, WPA, or U.S.E.S. referrals. The objective of the courses in the pre-employment area is to give specialized training in specific occupational skills and technical knowledge on training stations.

The trades which are included depend somewhat upon the needs of the locality. In the Milwaukee area the training stations are largely in the metal trades. The technical knowledge related to the trade skills is taught in conjunction with the shopwork. The training period in the pre-employment program ranges from a minimum of 120 hours to a maximum of 300 hours according to standards prescribed by the United States Office of Education.

### The Instruction Personnel

Industry is the source from which tradesmen are obtained to provide new instructors. Contacts for applicants are made through as many sources as possible. Some of these include newspaper advertisements, employers, employee groups, and persons who are in a position to recommend applicants. A personal interview with the applicant is arranged so that he can be given an opportunity to present his qualifications. This initial interview reveals a number of impressions relative to the applicant, such as, his personality as a prospective instructor, his ability to express himself, as well as a general knowledge of his qualifications. Interviews with several members of the staff, when possible, result in greater reliability in the selection of an applicant.

The initial interview is followed up by having the candidate submit an application form which covers in detail facts relating to personal information, practical experiences with positions held, education, including evening and plant training courses, leisure-time interests, community activities, the family and their interests, and references from several sources.

A full description of the training program, the nature of the teaching responsibility, the requirements of the instructor training program, and compensation are provided the applicant. The information obtained through the personal interview and through the application forms is evaluated to determine the applicant's fitness for teaching. It is essential that the applicant selected should show possibilities of developing into an instructor by taking an in-service training course.

### The Instructor-Training Program

The trade instructor obviously is confronted with many new problems in his position. The fast pace at which the war-production training has been introduced into the present vocational programs has left very little opportunity to train instructors. Men are employed and with a limited amount of preliminary training on routine matters are assigned to classroom duties. The instructor-training program must naturally follow while the new instructor is in service.

When this new instructor was employed in industry his sole responsibility was material production. The foreman in charge of the department gave the tradesman a blueprint with the job order specifications and supervised the details of the production job. In teaching, the new instructor's responsibility is somewhat similar to that of the foreman, in that he instructs learners on each of the training stations.

Teaching becomes the major function of the new instructor in this program. He teaches the learners how to use the different tools, machines, and equipment at the training stations. He teaches the learner how to read blueprints, solve mathematical calculations, and explains the use and qualities of different materials. He keeps in mind how to hold the interest of the learner in his work at all times so that he can give the necessary individual instruction at the time that it is needed. He also has the responsibility for managing the shop so that equipment and supplies are properly handled and controlled.

The relation of the instructor to the learner is maintained on a plane which commands the respect and confidence of the class. Teaching requires that the temperament of the instructor be of the type that shows that he has patience, is impartial, and exercises good judgment in his relations with the learners. The human factor undoubtedly is the key to the success of any instructor in his work. An understanding of the learner's avocational interests, his practical experience, and numerous other factors helps considerably in developing the interest of the learner. For example, the practical experience of the learners varies greatly. Some of this experience is recent and some has been outmoded due to technological changes based upon present-day practices. Some of the learners have worked as journeymen and others as helpers, and still others have had no experience at all; some have recently left school, some have become unemployed due to priorities on materials and conversion to wartime production, and others have been on relief projects for shorter or longer periods of time. Some are enthusiastic and want an opportunity to prove their ability by taking training; others have a long road ahead of them to regain their morale and social outlook. These are only a few of the factors which a new instructor faces in his relations with learners. Understanding that each man is an individual personality with great or limited abilities, the instructor meets a real challenge in training workers for war production.

### Content of the In-Service Training Program

Since the element of time is a limiting factor in training learners, this viewpoint is also accepted as a working principle in training new instructors. The immediate responsibility is to provide the new instructor with

some of the fundamental tools with which to begin teaching. The in-service training program is limited to those teaching procedures which have been demonstrated as being most useful. Since the courses which are offered are organized on a training-station basis, the training program takes into consideration the fact that individual instruction has to be emphasized to the maximum degree. To give the essential assistance to the instructor, the following points are covered in the course:

1. How to organize the work of the class for good management and effective instruction.
2. How to organize an outline of instruction and prepare units of instructions.
3. How to teach shop and related work.

## Organization of the In-Service Training Program

Any in-service training program must be organized to provide for regular meetings in order to present problems relating to methods of teaching and the use and preparation of curriculum materials. These meetings afford new instructors the opportunity to discuss the many new situations which arise in the shop and classroom.

The following outline is developed in organizing the class for good management.

### Classroom Organization and Management

1. *Preliminary Planning*
   - *a*) Requisitioning materials, supplies, repairs, and replacements.
   - *b*) Organizing the course outline of instruction.
   - *c*) Selecting shop library reference texts.
   - *d*) Preparing unit sheets of instruction.
   - *e*) Providing demonstration teaching aids.
   - *f*) Planning the teaching procedure.
   - *g*) Organizing assignments according to training stations.
   - *h*) Organizing routine classroom responsibilities.
   - *i*) Conferring with supervisor on problems relating to training program.
2. *Opening the Class Session*
   - *a*) Starting according to schedule.
   - *b*) Calling roll to check absences.
   - *c*) Enrolling new trainees.
   - *d*) Making announcements.
   - *e*) Assigning trainees to stations.
3. *Instruction Period*
   - a) Giving individual, group, and class demonstrations.
   - *b*) Following up work of trainees.
   - *c*) Recording ratings on training reports.
   - *d*) Making office reports.
4. *Clean-up Period*
   - *a*) Assigning trainees to shop upkeep duties.
   - *b*) Explaining shop standards relating to condition of room equipment, storage of supplies, arrangement of unit sheets and shop library reference texts.
   - *c*) Checking in tools, equipment, machine accessories, and work assignments.
5. *Dismissal Period*
   - *a*) Final checking of classroom by instructor.
   - *b*) Dismissing of class.

## Organizing and Preparing Course Material

The trade instructor in his new work is confronted with the problem of determining what to teach. His board background of industrial experience needs to be organized for teaching purposes. Before he can begin to lay out the course, or to use a course already prepared, he should understand the nature of some of the instructional problems. The sequence in which these are developed is as follows:

1. *The breakdown of the trade*
   - *a*) The analysis.
     - (1) Classification of training stations.
     - (2) Manipulative operations.
     - (3) Related and working information.
     - (4) Kinds of type jobs.

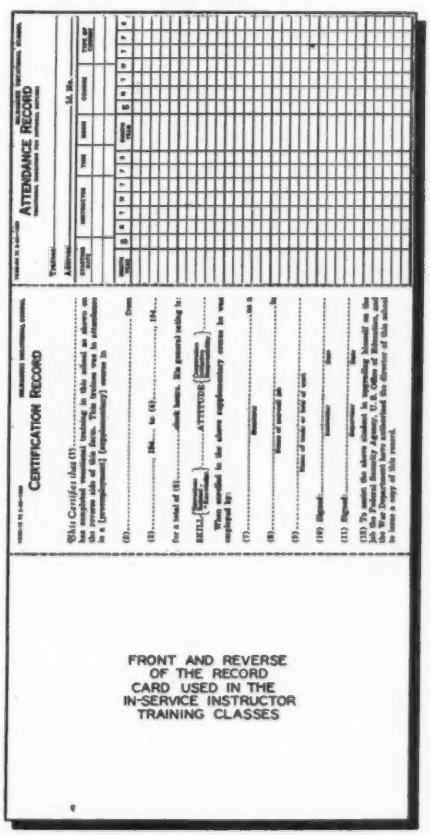
   (See form of record card below.)
2. *The specification factors in developing a course*
   - *a*) Objectives.
     - (1) General objectives of the supplementary and pre-employment courses.
     - (2) Objectives of the course for each training station.
   - *b*) Length of course.
     - (1) Number of hours.
     - (2) Number and length of each class period.
   - *c*) Previous experience of learners.
     - (1) Nature of practical experience.
     - (2) Extent and recency of education.
   - *d*) Facilities available.
     - (1) Tools, machines, and equipment.
     - (2) Materials and supplies.
     - (3) Teaching materials such as text materials, models, charts, and other visual aids.
3. *The preparation of the course outline of instruction*
   - *a*) Organization of outline.
     - (1) Selecting the tool and machine operations.
     - (2) Selecting the related or working information.
     - (3) Selecting the type jobs.
     - (4) Determining the teaching order.
     - (5) Formulating the unit objectives.
     - (6) Outlining operation steps and working knowledge.

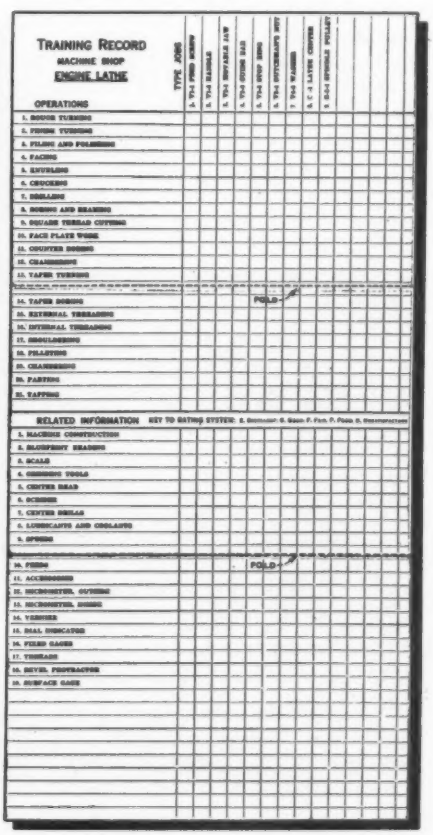
   (See page 145 for the Outline of Instruction.)
4. *The preparation of units of instruction*
   - *a*) Operation units.
     - (1) Name and objective of unit.
     - (2) General information relating to objective.
     - (3) Listing the tools, machines, equipment, materials and supplies.
     - (4) Descriptive information on "how" to perform the operations and indicating cautions.
     - (5) Setting up the titles for the photographs and drawings.

   (See Job Operation Units 1 and 14, pages 145 and 147.)
   - *b*) Related information units.
     - (1) Name and objectives of unit.
     - (2) General information relating to objectives.
     - (3) Descriptive information relating to tools, machines, and equipment, materials and supplies, mathematics, science, interpretation of blueprints and drawings, layout of drawings, trade codes and regulations, and safety and hygiene.

   (See next issue for Information Units 25 and 26.)
     - (4) Setting up the titles for the photographs and drawings.
   - *c*) Assignment units.
     - (1) Name and objectives of unit.
     - (2) General information relating to objectives.
     - (3) Drawings or blueprints of type jobs.
     - (4) Explanatory directions.
     - (5) Objective or essay-type questions bearing upon operations, related information and type jobs.

   (See next issue for Assignment Units 25 and 26, and Tests Nos. 25 and 26.)




FRONT AND REVERSE OF THE RECORD CARD USED IN THE IN-SERVICE INSTRUCTOR TRAINING CLASSES

## Teaching Shop and Related Classes

The new instructor needs the techniques of teaching. He should understand that each new learning situation involves developing new habits through constant repetition and practice. Teaching shopwork requires instructions on how to use the different tools and machines in working with materials combined with the use of the necessary related information to perform the operations on a job. In order to teach, it is necessary for the instructor to analyze the steps in each learning situation. Teaching, then, can best be done in the shop and classroom by explaining and showing to the learner the steps in slow motion. The learner then develops skill by repeating.

Each new instructor in the course is required to practice the teaching of a lesson in his shop. He is taught to analyze the steps in the teaching procedure. This gives him an opportunity to profit from the suggestions which are made. The steps in the teaching are analyzed according to the following plan:

**Steps in the Teaching Procedure**

A. *Preparation*
1. By whom — the instructor.
2. Its purpose.
   a) To introduce the lesson to be taught.
   b) To invite the interest of the learner.
   c) To determine what the learner knows and can do.
3. How it is done.
   a) Asking questions.
   b) Relating experiences.
   c) Showing illustrations or examples.
   d) Reviewing a previous lesson.
   e) Demonstrating with a short experiment or example.

B. *Presentation*
1. By whom — the instructor, with questions asked by the learner.
2. Its purpose.
   a) To have the learner understand how to do the operation or assignment.
   b) To have the instructor present the points to be covered in their proper teaching order.
3. How it is done.
   a) Telling with detailed explanations.
   b) Showing with slow-motion actions.
   c) Illustrating with visual aids.
   d) Demonstrating with use of tools, machines, and equipment.
   e) Questioning at each new key point.
   f) Checking instructions where needed.

C. *Application and Follow-Up*
1. By whom — the learner with special help of the instructor.
2. Its purpose.
   a) To fully understand what is to be done.
   b) To teach the learner by doing.
   c) To develop skill by performing.
   d) To correct errors.
   e) To have the learner prove what he can do.
   f) To prove to the instructor that the learner can perform.
3. How it is done.
   a) Assigning learner to follow instructions and demonstrate his ability to perform.
   b) Questioning the learner.
   c) Giving additional individual and group demonstrations.
   d) Giving explanations at difficult points.
   e) Providing for additional assignments that call for repetitive practice.

## Use of Text Material for Instructional Purposes

Individual instruction is the basic premise which governs the use of unit sheets in vocational training. There are several reasons for this: first, learners enroll in vocational training courses at any time while the course is being offered; and second, learners progress according to their individual abilities.

A variety of suitable text materials is available through many sources. The adaptation of the text material to each local community or situation needs to be considered in its use. This ranges from material that can be used by learners who can comprehend instructions with little difficulty to those learners who need the special help of the instructor in interpreting content. Since the range of abilities in learners is so varied it is necessary to provide unit and text materials that meet the needs of learners on an individual instruction basis.

Text material in vocational training is classified under three different types; namely, operation, information, and assignment.

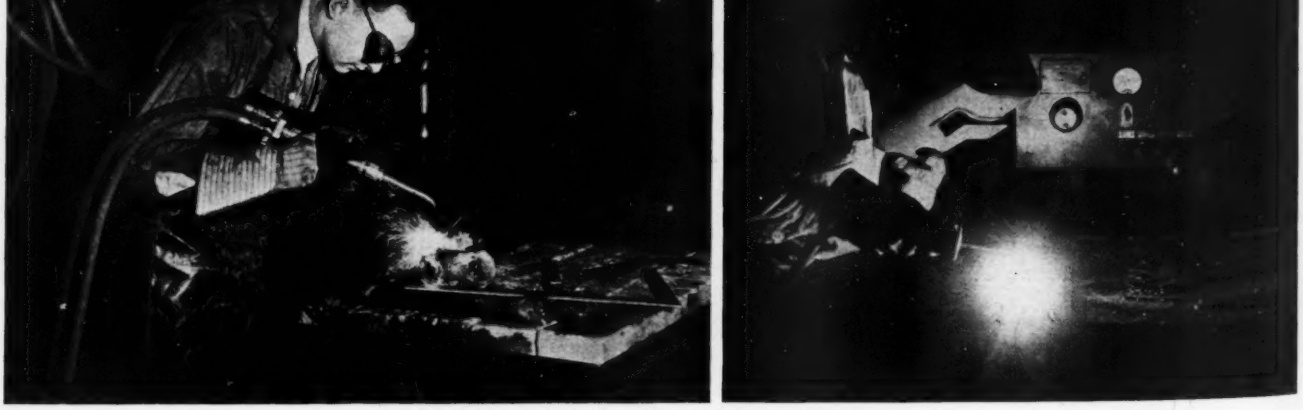
The operation units contain instructions on *how* to perform the fundamental manipulative tool or machine operations in shaping materials according to prescribed specifications. The operation unit is an excellent teaching aid provided it is preceded by the instructor's demonstration which should include the use of models, charts, blackboard sketches, and other visual aids. To expect a learner to follow the instructions in an operation unit is contrary to good teaching since the number of new learning situations in any one lesson is beyond the grasp of the average learner.

Information units contain related instructional material which is technical in nature and which must be known in order that a manipulative operation or job can be performed. These units can be classified under two types; first, that which has an immediate application in the performing of an operation or job; and secondly, related information in which a principle or rule is developed with general applications. The related information in both types includes the ability to interpret blueprints and specifications; make layouts or drawings; understand the use of tools, machines, and equipment; understand the characteristics of materials; understand methods of solving mathematical problems; and knowing the safety precautionary practices and trade code restrictions.

The related information unit should provide the answer to the *what* and *why* relating to the *how* in the doing of the operation or job.

The school should encourage the learner to do collateral reading of his own which is related to the shop instruction. Reference material in the nature of trade texts, trade journals and magazines, industrial catalogs, descriptive literature from manufacturers, and technical bulletins should be made available to the learner from a school library well stocked with these materials.

Appropriate assignment units should be provided. These should challenge the learner to



VEND students doing gas and electric welding

## OUTLINE OF INSTRUCTION

### Engine Lathe Course — Prepared by E. H. Rosenberg

This outline of instruction is suitable for VE-ND, day, and evening classes. The course requires attendance for 50 periods of 6 hours each.

**Objectives of Course**

1. To teach the use of the different machine operations on the engine lathe.
2. To understand the application of the related information in the operation of the engine lathe.

| *Unit No.* | *Name of Unit* | *Objectives of Unit* |
|---|---|---|
| 1 | Centering | To center and true up bar stock. |
| 2 | Rough Turning | To rough turn short or medium length stock to a given diameter. |
| 3 | Finish turning | To finish turn a cylinder to fit a test ring. |
| 4 | Filing and Polishing | To file and polish stock on a lathe. |
| 5 | Facing | To face the ends of a bar of stock. |
| 6 | Knurling | To turn with the knurling tool. |
| 7 | Chucking | To set up stock in different types of chucks for processing. |
| 8 | Drilling | To drill a hole in a piece of stock. |
| 9 | Boring and reaming | To bore and ream a hole in a piece of stock. |
| 10 | Square thread cutting | To cut square threads on a piece of stock. |
| 11 | Faceplate work | To set up and use a faceplate for processing work. |
| 12 | Counterboring | To enlarge a bored piece of work held in a lathe chuck. |
| 13 | Chamfering | To bevel the external corner of a piece of stock. |
| 14 | Taper turning with tailstock or taper attachment | To turn and fit a taper with tailstock set over. Also with taper attachment. |
| 15 | Taper boring | To bore a taper hole in a piece of work held in a lathe chuck. Use taper attachment. |
| 16 | External threading | To cut a helical groove of regular progression on a bar stock. |
| 17 | Internal threading | To set a tool for cutting an internal thread. |
| 18 | Shouldering | To turn and square a shoulder. |
| 19 | Filleting | To cut a radius or fillet with a forming tool. |
| 20 | Chambering | To increase the diameter in the bore to form a recess for lubricants. |
| 21 | Parting | To cut off pieces of stock. |
| 22 | Tapping | To bore a hole to the proper size for a certain diameter and pitch of tap. To hold a tap on the dead center for tapping a hole. |

analyze his work in an orderly manner preparatory to understanding the practical work he is expected to master. Such units should be so organized that the learner will, in carrying out the instructions, acquire both adequate understanding of the technical knowledge involved and the necessary skill to perform the required work accurately and quickly in accordance with acceptable work standards.

### Conclusion

The in-service training of new instructors for the supplementary and pre-employment classes is recognized as an essential factor in the war-production industries. The speeding up of training depends upon the instruction provided. New instructors, therefore, should understand teaching procedures and practices, including good class management, organization of courses, and instruction methods. The in-service training program will be determined by the needs of each local community.

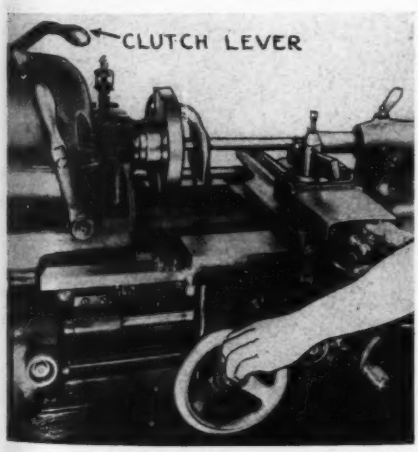



Fig. 1. Rough turning

## JOB OPERATION UNIT NO. 1

### Engine Lathe Course — Prepared by E. H. Rosenberg

**Rough Turning**

*Objective:* To turn short or medium length stock to a given diameter.

*General Information:* To rough turn means to turn down or take off a cut which does not reduce the stock to the finished size. Usually only the scale is removed.

*Tools, Equipment, and Materials:* Engine lathe, lathe dog, machinist scale, outside calipers, white lead, lubricating oil, roundnose tool, hexagon dog wrench, stock previously centered.

*Operation Steps:*

A. *Adjusting the dog on the stock.* Figure 2.

Fig. 2. Adjusting the dog on the stock

1. Select the dog which fits over the end of the stock.
2. Place the dog on the work, the tail of the dog pointing toward the centered end of the work and extending about ½ to 1 in. beyond the squared end.
3. Place a wrench of the correct size in the screw of the dog and tighten slightly.

NOTE: Never grind a wrench to fit the screw.

B. *Mounting the work on the centers of the lathe.*

1. Place one end of the centered work on the live center.
2. Hold the work near the dead center with your left hand and place a few drops of white lead into the centered hole.
3. Turn the dead center into the centered hole as shown in Figure 3.
4. Loosen the safety-dog screw and slide the dog along the work until the tail enters a slot in the drive plate.
5. Move the tail of the dog back and forth in the slot of the drive plate to make sure that the tail has the proper clearance. See Figures 1 and 2.

*Caution:* Do not tighten too much, while the work revolves, because the friction developed by the rotation of the stock will cause the metal to expand, thus creating greater friction. In time this will cause the center to burn off.

C. *Adjusting the tool to the height of the centers.*

1. Place the cutting tool in the toolholder.

NOTE: The tool bit should project no more than 1½ times the width of the tool bit. See Figure 4.

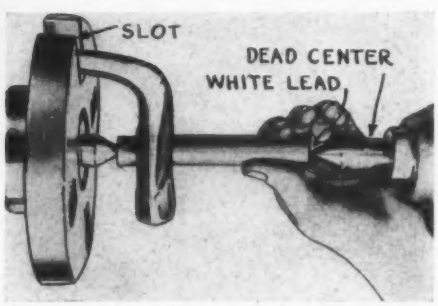



Fig. 3. Mounting the work

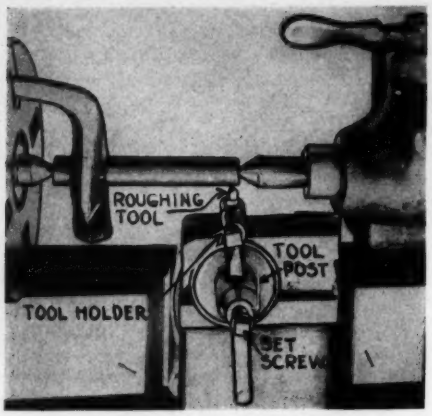



Fig. 4. Proper setup for roughing tool

2. Place the toolholder in the tool post.

NOTE: The toolholder should not project more than necessary from the tool post. See Figure 4.

3. Fasten the toolholder in the tool post by turning down the setscrew with a properly fitted wrench.
4. Set the toolholder so that the cutting edge of the tool is at the height desired for the diameter of the work.
5. Adjust the tool to the work by using the hand-longitudinal and cross-feed handles. Figure 5.

D. *Rough cutting the stock.*

1. Adjust the lathe for the correct cutting speed and feed.

NOTE: The revolutions of the spindle are determined by dividing the cutting speed by one fourth of the diameter of the stock.

2. Throw in the power longitudinal feed screw and start the cut by using the hand longitudinal-feed wheel. See Figure 5, for the various feed knobs and handles.

*Caution:* Loose or ragged clothing is dangerous to wear when operating a lathe. Finger rings should be removed.

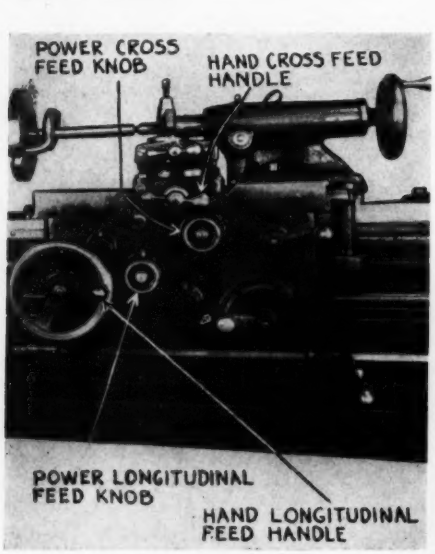



Fig. 5. Positions of feed handles and knobs

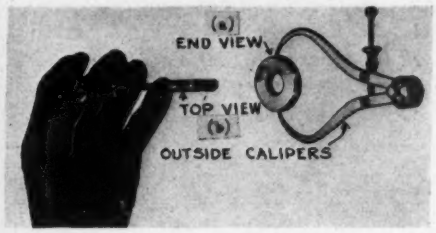



Fig. 6. Measuring with a pair of outside calipers

3. Set the tool to the depth of the cut required.
4. Tighten the longitudinal-feed knob by turning it to the right.
5. Take a cut about ¼ in. long.
6. Stop the lathe and test the work with the calipers for size. See Figure 6, *a* and *b*.

NOTE: Accuracy in caliper measurements depends on the sense of touch. To get a delicate touch of the calipers on the work, it should be held lightly and not with a tight grip. If sufficient force is exerted, a caliper set to an inch may be crowded over a piece of 1⅛ in. in diameter. Hold the calipers at right angles to the axis of the work.

*Caution:* Never caliper the work while the machine is in motion.

7. Reset the turning tool for size and continue the cut until the tool has cut about one half or three fourths the length of the stock.

*Cautions:* Do not turn too close to the dog because the dog might hit the tool rest and either break the tool rest or spoil the centers in the stock.

Do not break hot or long chips with the bare hand. Use a wrench or a stick.

8. Turn the power longitudinal-feed knob to the left to release the power feed.
9. Stop the machine by throwing out the clutch lever shown in Figure 1.
10. Return the carriage to the dead center by using the hand longitudinal-feed wheel.
11. Remove the stock from the lathe by loosening the spindle clamping lever and releasing the dead center.
12. Remove the dog and replace it on the turned end of the stock.

NOTE: Place a piece of tin or copper under the screw of the dog to protect the finish.

13. Remount the stock on the centers and finish the other half of the cut.

NOTE: The two cuts should meet in the center if the live center is running true.

14. Test for accuracy with the calipers.

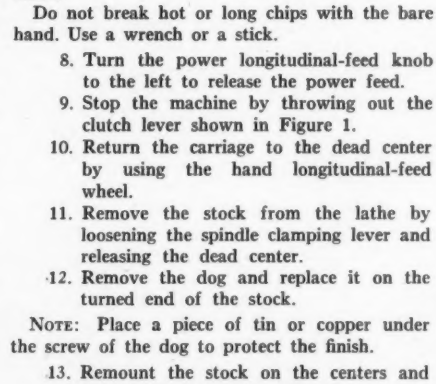


Fig. 1. Taper gauge

Fig. 2. Piece of paper pinched between the tool holder and the tailstock spindle

NOTE: The process of rough turning varies somewhat according to the kind of material and the type of cutting tool used.

## JOB OPERATION UNIT NO. 14

### Engine Lathe Course — Prepared by E. H. Rosenberg

#### Taper Turning — Use of Tailstock

*Objective:* To turn and fit a taper with a tailstock set over.

*General Information:* A taper is used to hold a tool in a definite position for drilling, reaming, grinding, milling, and boring.

*Tools, Equipment, and Materials:* Taper gauge. See Figure 1. Chalk, file, roundnose tool.

*Operation Steps:*

1. Lay off the length of the taper on the work.

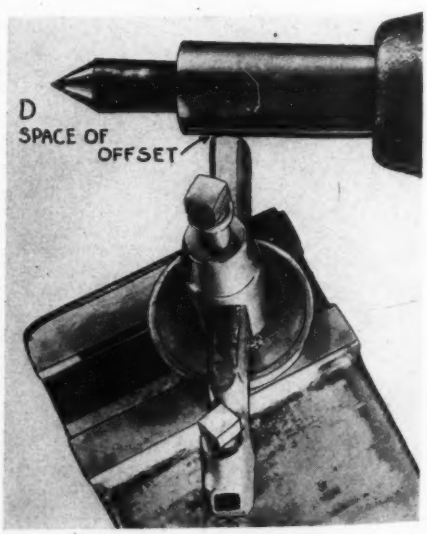



Fig. 3. Tool holder moved the correct distance away from the tailstock spindle

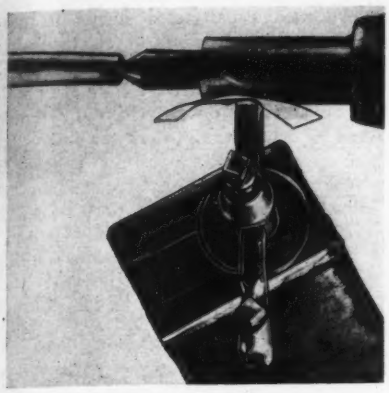


Fig. 4. Tailstock set over the correct distance

2. Set the cutting tool to the exact height of the center.
3. Set over the tailstock.
   *a*) Hold the tool post rigidly by clamping a tool in the tool post.
   *b*) Run the cross slide in until a piece of paper is lightly pinched between the toolholder and the tailstock spindle, as shown in Figure 2.
   *c*) Take up the lost motion in the cross-feed screw.
   *d*) Run the cross slide away from the spindle until the distance *D*, Figure 3, between the toolholder and the spindle is equal to the amount of the required offset. (1) Use the graduated dials for distance.
   *e*) Adjust the tailstock slide until the paper is pinched between the spindle and the toolholder, thus obtaining the required offset. Figure 4.
4. Rough turn the small end of the stock until it measures about 1/16 in. larger than the size required on the blueprint.
5. Oilstone the tool and take a very light trial cut.
6. Test in gauge.
   *a*) Draw the three chalk lines parallel to the center axis of the stock.
   *b*) Place the gauge lightly over the work.
   *c*) Place the gauge to the left to test for accuracy.

NOTE: If the chalk lines show contact along the whole length by rubbing, the taper is correct.

   *d*) If the contact is too great on the large end of the taper, that is, if the chalk is entirely removed, set the tailstock backward or away from the operator.

(To be continued)

# Some Aspects of Industrial-Arts Teacher Preparation*

STANLEY J. PAWELEK**

The study of the preparation of industrial-arts teachers is receiving increasing emphasis. Graduate students, educators, and professional organizations are focusing their attentions more and more upon this very important area of education. The Manual Arts Conference group has for many years conducted fragmentary studies in the manifold phases of industrial-arts teacher preparation, and is laying continued stress in this direction. Through its sponsorship many worth-while studies have been completed. Just recently, the National Association of Industrial Teacher Trainers, through its research committee headed by Dr. V. C. Fryklund, has completed a rather comprehensive study of industrial-arts teacher-preparing practices in approximately 90 colleges and universities in the United States.[1]

The writer has been interested in teacher preparation for many years. He felt a need for a study which would reveal not only how certain functional training characteristics are conducted, but also what industrial-arts educators considered to be the *best* practices.

A 26-item inquiry blank was eventually developed and sent to 142 colleges and universities, in the United States and Puerto Rico, which were assumed to prepare industrial-arts teachers. Out of this number came 100 completed forms from 38 states and Puerto Rico. Included in the group were 59 teachers colleges, 28 state universities, five private universities or colleges, four institutes (such as Bradley, Stout, etc.), three state liberal-arts colleges with teacher-preparing functions, and one municipal university.

The inquiry blank was designed to gather information about (1) existing practices; (2) *jurors* (heads of industrial-arts education department) judgments regarding best practices; and (3) citation of objective evidence in support of either practice or judgments. It concerned itself with the following items of industrial-arts teacher preparation:

1. Standards for admission of students to industrial-arts education departments.
2. The control of shops and drafting rooms in which industrial-arts education shop and drawing courses were taught.
3. The professionalization of shop and drawing courses.
4. Years in college during which shop and drawing courses are taught.
5. Prescription or election of articles to be made or plates to be drawn.
6. Years in college in which students are given initial contact with professional industrial-arts education courses, and supervised student teaching.
7. The placement of responsibility for teaching students certain functional items of information such as writing letters of application, applying for a position in person, conducting one's life in his teaching community, and many others.
8. The percentage of the total number of credits in the curriculum devoted to each of five divisions: (*a*) shopwork and drawing; (*b*) general academic; (*c*) general professional education; (*d*) supervised student teaching; (*e*) professional industrial arts.
9. Certain supervised student teaching practices.
10. The combining of other subjects and extracurricular activities with industrial arts for teaching purposes.
11. The departmental library.
12. The teaching of industrial-arts education students relative to the organization and conduct of general shop classes.
13. The follow-up and supervision of recent graduates who are on their first job.

### A Summary of the Findings

1. In 82 per cent of the industrial-arts education departments, any student admitted to the institution is automatically admitted to the department. However, over 95 per cent of the *jurors* favor the establishing of definite standards for admission. The five highest-rated bases for admission are: (*a*) general intelligence; (*b*) personal interview; (*c*) scholastic standing in high school; (*d*) high school teachers' judgments; and (*e*) secondary school industrial-arts experience.

2. Seventy-six per cent of all shops and drafting rooms are under the direct control of the industrial-arts education departments. In the remainder, either all or some shop and drawing courses are taught as service courses by other departments. The jurors are predominantly in favor of the former plan, but see some advantages in the latter by way of less duplication of equipment and more emphasis on manual skill.

3. Eighty-nine per cent of the departments professionalize some or all shop and drawing courses, while only 73 per cent of the jurors favor professionalization. Those who object, do so because they feel professionalization detracts from the development of fundamental skills in shopwork and drawing.

4. Eighty-two per cent of all the depart-

*An abstract of an unpublished doctoral dissertation entitled, "An Analysis and Evaluation of Certain Common Functional Training Characteristics of Teacher Preparation in Industrial Arts," The Pennsylvania State College (August, 1941).

**Supervisor of Industrial Education, Baltimore, Md.

[1]Verne C. Fryklund, *Industrial Arts Teacher Education* (Bloomington, Ill.: McKnight and McKnight, 1941), 112 pp.

ments offer shop and drawing courses during all four years of the students' college career. Eighty per cent of the jurors consider this to be the best practice, but add that a definite sequence of courses throughout the four years is desirable.

5. Regarding the prescription or election of articles to be made or plates to be drawn in industrial-arts education shop and drawing courses, there is very little agreement. The amount of prescription recommended varies between 0 and 100 per cent. The model recommendation is for heavy prescription in the lower division, with less in the upper.

6. Seventy-four per cent of the departments offer strictly professional industrial-arts education courses for the first time in the junior year. Seventy-five per cent of the jurors consider this to be the best practice. To justify this judgment, a majority of the jurors say that a certain amount of shop and drawing experience is necessary as background for professional courses.

7. Thirty-two per cent of the departments offer supervised student teaching for the first time in the junior year, and 61 per cent in the senior year. Forty-seven per cent of the jurors consider the junior year as best for this experience, while 43 per cent would defer it until the senior year.

8. The jurors show little agreement with regard to whose responsibility it is to teach certain functional items of information to prospective industrial-arts teachers. Out of 24 items listed, they say they would assume the entire responsibility for only the following eight: (*a*) Teaching industrial arts to girls, (*b*) Constructing instruction sheets, (*c*) Taking inventories, (*d*) Ordering supplies and equipment, (*e*) Teaching a general shop course, (*f*) Maintaining tool, supply, and finishing rooms, (*g*) Maintaining shop discipline, (*h*) Demonstrating to a class.

9. The jurors' composite judgments indicate the following percentages of the total number of credits to be devoted to the five divisions of the industrial-arts education curriculum: (*a*) shopwork and drawing, 30 per cent; (*b*) industrial-arts education professional courses, 8 per cent; (*c*) supervised-student teaching, 6 per cent; (*d*) general academic, 38 per cent; (*e*) general professional education, 18 per cent.

10. The following is a summary of practices and judgments with regard to supervised student teaching:

*a*) Eighty per cent of the departments conduct *extensive* student teaching. Under this plan the students carry other courses at the time of student teaching. A majority of jurors feel that this is the best plan.

*b*) In 31 per cent of the departments, industrial-arts education students are required to do *academic* student teaching as well as the industrial arts. Fifty-seven per cent of the jurors consider this the best practice.

*c*) In 28 per cent of the departments, student teaching is required on more than one grade level; and in 48 per cent of the departments, in more than one area (wood, drawing, metal, etc.). Ninety per cent of the jurors consider these practices best.

*d*) Fifty-one per cent of the jurors feel that the campus-laboratory school does not provide the best student teaching experiences. The chief argument against this was that the "whole situation is artificial."

11. About 50 per cent of the jurors are opposed to the practice of having industrial-arts teachers coaching athletics, leading bands, and performing other duties which take a great amount of out-of-school or after-school time. The best subject combinations with industrial arts, they feel, are mathematics and science. The poorest subjects to combine with industrial arts are dramatics, music, athletics, and English.

12. Fifty-seven per cent of the departments indicate having departmental libraries. One half of these house the libraries in the departments, while the remainder have a portion of the institutional library devoted to departmental books and periodicals. Forty-seven per cent of the jurors regard the former as the best practice if a capable librarian is in charge, and if certain problems of cataloging, binding, repairing, checking out and in, etc., can be solved.

13. The jurors, in the main, are not entirely clear about the meaning of the term *general shop* and the conduct of classes under the *general shop* plan.

14. Most of the departments (93 per cent) indicate that they are doing something about supervision and follow-up of recent graduates who are on their first job, but the practices are not at all uniform. Sixty-three per cent indicate that they keep *in touch* by means of personal correspondence, 28 per cent issue a departmental *newsletter,* and 46 per cent make periodic or unscheduled visits at least once a year. The majority of the *jurors* consider the latter as being the best, but often impractical because of distance, time, and cost.

15. The jurors failed to make a single citation of objective evidence for either practice or judgment. The most frequent response to this query was *experience.*

### Some Educational Implications

1. The situation wherein no definite standards of admission to industrial-arts education departments obtains is not a desirable one. It is a certainty that the best industrial-arts teachers will not be produced until the candidates for this profession are selected with care. Several bases for admission ought to result in a better selection than any one single basis. A high intelligence quotient, plus an interview with the candidate, plus evidence of high secondary school scholarship, plus statements about the candidate from his high school teachers would be a satisfactory beginning. In addition it seems sound, as some jurors have expressed it, to place the candidate on probation for at least one college year to determine his aptitude for becoming an industrial-arts teacher worthy of the name. Should he fail this last test, he ought not be permitted to continue, but instead be guided into other vocational areas.

2. A majority of the jurors feel that all shop and drawing courses in the industrial-arts education departments should be professionalized. "We teach as we are taught" is a good adage to follow, many say. Professionalization need not detract from the acquisition of skills if done incidentally during lectures or demonstrations by the instructor. Telling students how a certain process is best taught to others at the time this process is being taught them seems to be a much more effective way of "putting the idea over" than to speak about it abstractly in a *methods* course. It is the experience of the writer that by so doing the courses suffer no *thinning out,* and, in most cases, the students learn even more efficiently.

3. The jurors, in the main, agree that shop and drawing courses should be offered in a designed sequence throughout the students' four college years. Certain beginning courses may well be offered during the first two years, with advanced courses coming in the junior and senior years. This plan supplemented by well-chosen professional courses should result in a well-balanced curricular pattern for prospective industrial-arts teachers.

4. It appears from the jurors' responses that a certain amount of prescription of jobs to be done, articles to be made and drawing plates to be drawn in the beginning of each shop and drawing course is desirable. This insures the learning of certain basic fundamentals, and prepares for a more sound selection by students in the later stages. Even then a *guided* choice by the instructor would seem superior to a *free* choice on the part of students.

5. Most of the jurors are agreed that professional industrial-arts education courses should not be introduced until the students' junior year. It appears to the writer that some professional courses, not necessarily methods, might well be introduced in the sophomore or even freshman year. Since it is assumed that most of the students are preparing themselves to be teachers, it does not seem that the freshmen or sophomore year is too early to begin thinking about the professional aspects. Steeping students in certain fundamental beliefs and facts related to teaching would probably result in attitudes and habits not easily acquired in the upper two years only.

6. The percentage of time allotments to the five major divisions of the industrial-arts education curriculum appears to be an excellent composite judgment. This practice if followed in all departments would undoubtedly result in well-rounded industrial-arts teachers. There is ample provision for a cultural education along with the specifically technical.

7. Industrial-arts teachers, as well as other teachers, need to be informed about many items of functional information. The writer feels that many such items are completely omitted from the students' educational experiences because of the attitude that these should be taught in other departments. Therefore, it is urged that every industrial-arts educator make a list of these items, include them into courses of study, and insist that

every student in the department have the information. This should eliminate passing the buck, and be of great service to industrial-arts teachers.

8. Observation of teaching ought to begin at least in the sophomore year followed by supervised student teaching in the junior and senior years. Other professions such as medicine, law, and dentistry are now requiring observation and limited participation during the early stages of the students' preparation. This practice, it is claimed, produces a more profound interest in the chosen field and leads to a deeper understanding of the technical skills involved. It seems that similar requirements in industrial-arts teacher preparation would yield highly desirable outcomes. One term of supervised student teaching does not seem ample. Neither does it seem sufficient to teach in only one area, such as woodwork, or in one grade level. Each area of shopwork and drawing, and each grade level presents different problems, and the prospective industrial-arts teacher needs an acquaintance with as many of these as possible. Since many industrial-arts teachers are required to teach an academic subject in addition to industrial arts, it seems plausible to require some supervised student teaching in an academic subject as well. It seems to the writer that supervised student teaching extended over a two-year period is a better plan than the short, intensive arrangement now so frequently found in practice.

9. The writer's philosophy and experience are in complete agreement with the judgments of the jurors who object to having industrial-arts teachers coach athletics, lead bands and other musical organizations, or handle extracurricular activities which can be easily judged by the public. The battle for prominence usually is won by activities other than industrial arts, and the teacher devotes most of his time to those which *show him up* in the eyes of school patrons. It is true that the industrial-arts teacher ought to perform his share of the faculties' responsibilities but it seems better for him to teach other classes, help with home-room duties, or others, not demanding as much out-of-school time nor spectacular performance.

10. A departmental library located in the industrial-arts education department with a student librarian in charge seems to be favored by nearly one half the jurors. From the evidence presented the writer has concluded that this plan entails much more than appears on the surface. The many problems of binding, checking out books, keeping records, replacing losses, collecting fines, and others, seem to be only an added responsibility to those already heavily burdened with teacher-preparing problems. It seems a much more workable plan to keep all books and periodicals in the institutional library subject to library regulations. A reading room in the department is desirable. Students may use this for perusing books or periodicals secured from the regular library or from the private collections of the instructors.

11. Since the general-shop idea seems to be so prevalent, prospective industrial-arts teachers need to be informed about its underlying philosophy and methods of operation. If the department preparing teachers is not operated under this plan some provision needs to be made for teaching about it. Professional courses entitled *The General Shop* ought to be conducted, or some portion of various *methods* courses should be devoted to a study of the general-shop plan. Industrial-arts educators ought to be thoroughly familiar with the philosophy and best methods for conducting general-shop classes.

12. Industrial-arts educators cannot consider their responsibilities completed upon the graduation and possible professional placement of their students. Any assistance that they can render to those performing their first teaching duties will in most instances be not only welcome by the teachers but by principals and supervisors as well. The best method of follow-up and supervision, according to the jurors is actual visiting of the teachers at work. If this is not practical because of distance, time, or finances, it seems that an effort ought to be made to keep *in touch* by means of personal letters or departmental newsletters. The graduate ought not to be made to feel that the department has no further interest in him after he receives his diploma or degree.

13. Industrial-arts educators could receive a great deal of benefit from conducting a variety of experimental studies to determine the efficiency of various practices now in vogue. Empirical evidence is desirable and necessary but not always conclusive. There is ample opportunity for conducting scientific research in industrial-arts teacher preparation which would not only furnish valuable information but also increase the prestige of those charged with this very important responsibility.

# The Value of an Experimental Attitude

NOEL B. GRINSTEAD*

The desire to experiment is one of the most distinguishing characteristics of a good teacher. At the beginning of each new year it is wholesome for us to take a careful inventory of our accomplishments and learn to what extent we have shown improvement over our previous efforts. The experienced teacher will do well to recall his first years of experience in teaching and recount the many things that he had to plan and organize before he did the job to his own satisfaction. Then it would be enlightening for him to consider if his learning in succeeding years has been commensurate with that of his first years of teaching.

Frequently a teacher is heard to express the notion that he learned more in his first year of teaching than he had learned in the four years or more of college. While college officials and teachers might be disposed to defend themselves against this assertion, the idea has in it some large elements of truth. It affords splendid grounds for the teacher-in-training and the representatives of the training institution to take stock and evaluate.

Is this assertion a condemnation of the nature of preparation that was afforded the individual in college? Is it a criticism of the way in which the graduate applied himself while in school? Is it an admission that one has finally freed himself from hindering influences, and is now on his way to self-attained success? Or is it likely that the statement subtly compliments the very basic purposes of the college in which the teacher received his formal training? There are grounds for thinking the latter may be true. It is a justifiable feeling, up to a certain limit, that one owes his success to his own efforts, which many of us, under mild pressure, might be ready to admit. No doubt, many of the facts, principles, procedures, operations, and plans that the college professors endeavor to build up as a part of the equipment of the prospective teacher find tough competition from school activities, frats, athletics, jitterbug contests and jelly joints — even other school subjects. College authorities are interested in the effect of all these experiences on the product of the school, because they realize that the success of the institution or the department from which the student graduates, depends to no little extent upon the ability of graduates to make good, and to continue to grow during a long period of time, regardless of the influences which bear upon this result. But the first-year man or the tenth-year man — all of us — have it brought to us con-

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tinually that in college we learned so little of what we must know to teach.

After all, what is learned in college? In industrial arts it is planned to provide experience in a number of areas of industrial or mechanical work. In some of these areas the goals are to develop among students a reasonable degree of skill, afford a knowledge of methods, materials, tools, equipment, organization, plans, costs, construction, design. In other areas the college would make tangible the questions of objectives, problems in teaching, techniques, tests, course organization, personal and community relationships. Again, it is hoped to provide opportunity for sampling a variety of areas of construction work in which the teacher-in-training may do some experimenting to get the feel of the tools and materials, and to test that type of activity in terms of his own interest or his ability to make it worth while; or to enable him to foresee possibilities for experimentation when he goes to his own job of teaching. Throughout the four college years, certain attitudes are being developed out of the relationships between teachers and students or between students. These attitudes grow out of situations that are created or that cannot be escaped where people live and work together. The naturalness and the personal nature of contacts in industrial arts is mutually developmental to students and instructors. Both are learning, so the alert and self-respecting teacher modifies his attitudes and methods by observing student reaction. The student must develop the habit of doing the same thing. He may see shortcomings in the work, the personality, or the preparation of a teacher. Let him set for himself a purpose to eliminate that weakness from his own teaching. Or it may be that there is some element of strength in a teacher or another student which may be emulated without danger of one sacrificing his own individuality.

As pointed out, there is a wide spread between what we set out to teach and what is actually learned, regardless of the age of students being dealt with or the setting afforded. Particularly in the more technical aspects of shopwork, the schools are yet quite far from their aspirations in the preparation of teachers or the training of craftsmen. The student in college, say as one in a class of 25, does not have a responsibility in this respect that compares with the obligation that he assumes when he must see to it that each of his own students must learn. In college he shares the responsibility with other members of the group; in teaching he is responsible to and for 25 or more students in possibly each of a half dozen classes during the day. He is more or less on the spot each day. Things that he learned or to which he was afforded exposure are so far back in his head that he has difficulty in bringing them to the surface on demand. So he "looks them up" and he may become convinced that these are facts that he has never known before. Whose fault is this? Make your own decision, but it will probably end in a draw, because, although effective learning accrues from effective teaching, opportunity to learn must be mixed with sufficient desire. But the important point is that, even though many of the facts *learned* are forgotten, if a student has developed the attitude of wanting to be prepared, the college can be fairly satisfied. If the graduate who in his first year of teaching feels that he has learned more than he did in college, will continue in this line of thought, it may be said that a good teacher has been prepared — prepared to make good and to improve with experience. So in a second year he may say that he learned more than in the first, and that he wants to learn more and do better in each succeeding year of experience. He can do this if he has developed an attitude of constant alertness in reading, observing, and experimenting, both in and out of school.

The point of view that one has is worth more, in the long run, than the specific knowledge or experience that he gets in organized technical or profession courses. The industrial-arts teacher who carries with him the attitude of purposeful experimentation, and who has an adequate social and cultural beginning along with thorough basic training, likely is headed for reasonable success. Each year in teaching he may carry on one or more experiments to round out and continue the preparation that was begun in college. But all experiments that one makes should have definite purposes, some serious and some for fun — but all purposeful. The shop teacher may play with a different medium such as clay or plastics; or with new procedures or methods of presenting learning material to groups; new checking methods to test the effectiveness of his teaching; new projects or new designs in a new area or in one of the long-established areas such as woodworking; a new type of tool or equipment item; or introduce new areas in his classwork by the trial balloon method. He may re-evaluate his objectives. Every year he can see progress in one of these directions even though it is just a minor improvement in what was done in previous years. The teacher can do no less than to keep his course content fluid and up to date, or to revise one or more of his course outlines, regardless of how well satisfied he may be. Or his experimenting may be done during vacation and away from schools, where, for instance, the value of a trip or a summer job toward the improvement of teaching depends upon one's resourcefulness in applying what he sees and what he hears to what he does. It might be well, if he can pull himself away from the requirements set up by accrediting agencies, to gain some industrial experience and incidentally replenish the budget.

A content experiment does not need to be completed in a single year. It may be carried on for several years before it proves that it has sufficient learning content to be included in an existing course, or to be set up as a new and separate course or club undertaking. The right attitude is not that the present work is to be condemned, but that one must be always on the alert to find out if there should be something better. It is a good suggestion to be radical in our thinking and experimenting, but to be conservative in supplanting a tested program with one that has been given only a brief and inadequate trial. New developments must justify themselves, in spite of the fact that they are essential to growth.

It is hardly possible that the industrial-arts teacher would be confused about where to go for research materials, or how to recognize the problems that would benefit his work. There is no need for us to look to other areas than our own for our experimental ventures. Any type of work that is considered with a view to incorporation in a teaching plan must have unmistakable industrial-arts characteristics. It should be representative of a type of activity that employs a considerable number of people, either gainfully or during leisure; it should always retain a fundamental element of construction or doing; it should afford valuable learning and information; it should be above the level of play, and require some thought and planning. Often, in this type of experimental research, teachers find it difficult to see the fine line of distinction that lies between industrial arts and science or other activities, but when we think clearly in terms of identifying characteristics, there will remain few serious conflicts.

Two examples of the distinction just mentioned will indicate the line of thinking suggested. A study of the theory of electricity with the accompanying laboratory experiments with circuits, bells, buzzers, buttons, batteries, and so on is definitely in the science area as subject-matter areas are commonly divided. But the making of splices, wiring circuits, house wiring, installation of electrical appliances, lights, winding motors, and the like are just as clearly industrial arts. In one case the laboratory work is to test and demonstrate the theory. In the other case the theory is to supplement the basic operations of doing the practical job intelligently. Take photography. If we are interested in experimenting with various mixtures of chemicals, determining the chemical reaction in the process of developing film or prints, or studying the optics of lenses, we are following out the science approach and purposes. On the other hand, if we are essentially interested in taking pictures, developing, printing, and enlarging, and gaining enough information on cameras, films, developers, and other items to get results and to work intelligently — emphasizing good results and learning to appreciate, the characteristics are those of industrial arts. Where the emphasis is upon the establishment or verification or application of laws or principles, or to determine facts resting upon hypotheses, science purposes are uppermost. There is no conflict, and much to the contrary, science training is a most valuable adjunct in the subject-matter preparation of an industrial-arts teacher.

It is not always left to the individual to initiate the movement in carrying out experiments. Those who have the advantage of teaching in a community where there are several shop teachers will be stimulated by what others are doing. Those who teach in larger population centers and who have the advantage of trained supervision are particularly fortunate in that they work under the

stimulating effect of comparison and suggestion. But the teacher in the more remote sections must prime his own pump. If he has the true spirit he and his students will motivate their own experiments. And in this respect it must be kept in mind that it is not necessary for the teacher to effect all experiments that are made in the department. All that is needed by the alert student is a suggestion by the teacher, and he will gladly carry out the purposes of the teacher and enrich the content of the course as well as to derive much satisfaction in doing something that tests his own resourcefulness and initiative. Students must receive their share of the credit for improving courses. Oftentimes if they are encouraged to be inquisitive and to use their own initiative and judgment, they may do a large portion of the experimenting for the teacher so far as it pertains to shop projects or organization. Countless other things are left to the teacher, who, at the same time, should not fail to do some construction work each year, not only to keep his hand in, but to stimulate the interest among students. Regardless of the isolation of a teachers location, there can be little excuse for his failure to make progress through reading, thinking, going places, and observing.

To experiment is to grow, and when we quit growing we become professionally inert. But to do important things with no more fixed purpose and understanding than to be different or to tinker is slow suicide. Look at the good teachers among your acquaintances, and you will find that one of the reasons why they are successful is that they have a well-developed and permanent experimental attitude. The composite of their learning of things to teach is far beyond their formal preparation. They can truthfully say that only the desire to grow in the right direction and to learn was taking root in college, and the college can grow and develop only as it learns the problems of those who go out in the field.

# Equipping the School Printing Department

R. RANDOLPH KARCH*

One of the vexing problems facing the school administrator is whether or not to include a school printing department in his industrial-arts or vocational-education program. In the former, he faces the cost of equipment, the room in which to place this equipment, and the employment of the teacher, and whether or not this unit should be a part of a general shop or of a unit shop. In a vocational high school, he is confronted with the opinion of the city printers, the demand for this type of training, the cost of the equipment, and the employment of a good teacher.

This article will not deal with the problem of whether or not such shops should be installed. It deals with the problem of buying equipment, and housing it well after the decision has been made to set up the printing department. It also is concerned with the purchase and placing of additional equipment for a laboratory already established.

## Not for Production

The production of printed material for the school — including the printing of the school paper — should not enter into the discussion. School departments set up with the view in mind to do the school's printing cheaply usually ends up in a plant that has little, if any, educational value, and perhaps in a row with the local printers. If printing can be added to the curriculum on its educational value alone, then it should be done.

The trend toward making the industrial-arts printing program a true *graphic arts* program should be noted. Such a plant, including such subject matter as letterpress and offset lithography, bookbinding, and silk screen printing, along with adequate related material, can truly be a *general shop* in itself.

It may be said at the outset, that a unit shop in printing will not cost more than a shop set up to teach woodworking or machine-shop practice. It will probably be less. Rough estimates on costs are included in the table presented herewith.

There is no dearth of good printing teachers. Both trade men and industrial-arts men can be found, willing and eager to take up the work of teaching industrial-arts printing, or to give adequate training for the trade, whatever the objective of the school may be. It is true that some practical printers, when hired as industrial-arts teachers, cannot see the point of view of the industrial-arts program, and work on production methods solely because production is what they know. It is also true that college-trained printing teachers cannot grind out production for the board of education, because they do not know how to do production. The total elimination of production from the industrial-arts shop is the only solution to the problem of securing meritorious graphic-arts instruction. Some production, it is believed, is necessary in the vocational laboratory. Because a vocational teacher knows how much production he can do through instruction, he and he alone should determine the deadlines of any work he sees fit to do.

One of the larger type-and-equipment sales offices maintains an educational department which employs experts not only in the field of graphic-arts education, but also in specifications and layout of the equipment to be used in the various levels of this type of education. Surely one will benefit greatly by calling in these experts to aid in the problem of setting up a laboratory.

## Type

The problem of equipping the school printing department with type was discussed by several hundred printing instructors at the Nineteenth Annual Conference on Printing Education, held at Rochester in the summer of 1940, by the National Graphic Arts Education Association. Stenographic reports on the symposia question: "What type faces should be added to the shop at the present time?" was answered in the junior high school section as follows: "This depends on the situation in which the instructor finds himself and on which he already has. The type faces ought to be secured in type families rather than in individual sizes, and there should be a variety of representative faces in order to introduce typography in its true sense."

The same question was answered thus in the senior high school group: "Those type faces should be chosen which fit in best with the production of the print shop, and they should be such that will last for several years." The stress here, with which this writer does not agree, is upon what printing is done for the school, and upon a well-wearing type face. As no comment was made as to *what* type face, it is hard to determine whether the meaning here is to buy type of the right alloy (that is, foundry type or monotype); or on a face which lacks fine serifs and fine lines and will therefore last well.

The most definite answer is found in the report of the vocational high school group: ". . . faces should be added that are being used in industry and that would be used as a teaching device." Although not going into detail, this group probably meant the newer sans and square serif types in all weights and families, plus those traditional faces still popular: Bodoni, Garamond, and Caslon.

Type faces for the plant now being planned were also discussed at this conference. The senior high school teachers reported: "Traditional type faces should form the basis for the entire plan. We have to have the traditional types to start with." If by this com-

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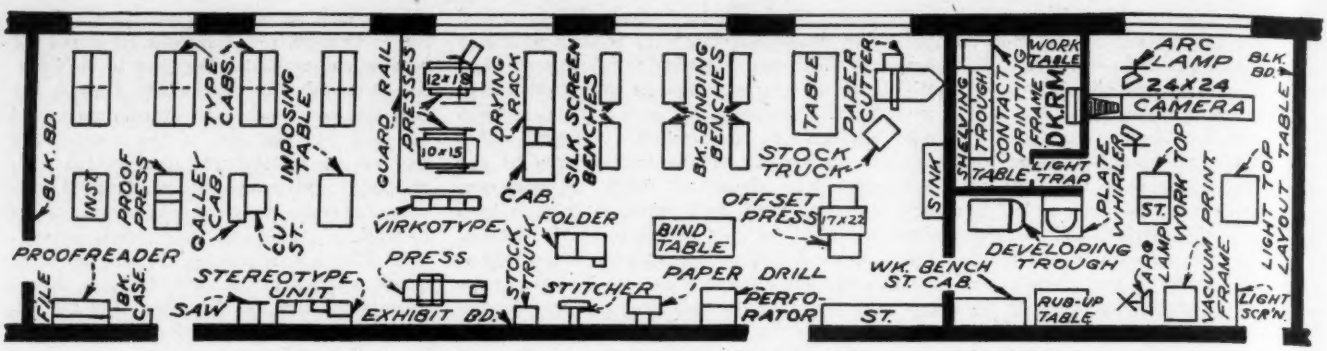



Typical plant layout for teaching letterpress printing and lithography

ment they meant the Garamonds, Caslons, and Bodonis, we can agree. If they meant the old stuff such as Antique, Cheltenham, Century, and Copperplate Gothic, we cannot agree.

As for types to be purchased for a new trade-school shop, the vocational group obviously decided to adhere to the traditions already set up in the respective school systems: "It would be necessary to determine what types were being used by other departments and buy accordingly." Why new shop equipment must be based on and copied from that selection of type used in a department set up probably 20 years ago is not clear. It probably rests on some regulations laid down by standards set up in the past, and certainly does not take into consideration the changes made in type styles developed since then.

It is hard to understand how this answer is justified in the light of the question: "It has been said that school printing is of low typographic quality. If this is true, what can the instructor do to improve it?" The vocational teachers said that the "teacher could take a course in typography." Present-day typography courses surely are *not* based on old-fashioned types.

According to industrial standards, type over four years old is written off as either out of date or worn out. Some schools use type for years until it is worn down *to the second nick*, or until the *y*'s look like *v*'s, and the periods disappear on the printed page.

One school system standardizes on Cheltenham for body type, another on Caslon 540. The former is out of date by trade standards, the second wears out too fast because it is very fine and has delicate lines. If a type must be furnished because it has long wearing qualities, a boldface type having *no serifs* would be the best.

There is only one solution to the difficulties encountered in having two or more boys set type from the same type case: provide a separate case for *each* individual. As two cooks may spoil the broth, two or more boys who know that others work on the same case will not be very much interested in keeping it *clean*. It is fundamental, then, that enough cases and type be provided for each boy who is to learn type composition. This is true also of a galley and a place in a galley rack.

Strange as it may seem in this year of 1941, and with all the experiences of the past, teachers still believe that straight-matter type composition is important. Some of it is, of course, in order to learn the lay of the case, the use of the composing stick, and care of type. Just how much straight matter type should be set by the boy in industrial arts and vocational education has not yet been agreed upon. It would seem that 500 to 1000 ems would suffice for the industrial-arts student. The vocational student, perhaps, should be expected to set proportionately more. If this can be agreed upon, then the shops must have more qualities of display types, perhaps a standardized assortment in several different type cabinets. This is not the way school shops are now equipped, however.

### Presses

Opinions vary greatly in the installation of press equipment. The teacher who has had no experience with automatics will shy away from the suggestion that one be added to his equipment. The man with practical experience will *need* one, and find many arguments to back up his wants.

The usual setup includes power-driven platens. Because the cost of power machines is relatively high, few are added. Instruction in presswork is dependent upon the number of presses in the school. If presswork is important to the curriculum, sufficient for the student load are vital. The average layout allows 24 boys to work on typesetting, and *only two* on presswork. To allow more boys to work at the presses, the teacher is often tempted to allow four boys to work in a rather strange setup as follows: one feeding, one handing the feeder the sheet, one taking the sheet away, and one inking the press. Although this takes four boys *out of the instructor's hair*, so to speak, it has its additional hazards of injury through horseplay, plus the curious working condition which is certainly not trade practice.

For industrial-arts equipment, it would be better to purchase hand-operated presses, and have no power-driven machinery whatever. First, with this plan, more presses can be bought of this style in the 4 by 6-, 6 by 10-, and 8 by 12-in. sizes. As many as five presses of the hand-lever type can be bought for the price of one power platen press. Furthermore, the five would not take up any more space than the one power machine. We might add that power machines beget production, and production breeds more production. The census of teacher's opinions shows that production should not be a part of an industrial-arts program.

In the vocational school, it is agreed generally that platen presses should be a part of the equipment. Over 100,000 of these platens are in use today. The addition of cylinders or automatically fed platen presses should depend upon those machines used in the educational area of the school shop, and not in any case dependent upon bids from manufacturers of different makes. Why train a boy to operate a machine which the printers of the city do not have? The only thing in common in this type of training is that the make-ready is practically the same. Surely there is some transfer of training, but not enough to justify the press in the eyes of the local printers, who will or will not hire the product of the school.

### Typecasting Machines

It is generally agreed that the industrial-arts printing departments should not have keyboard linecasting machines, or machines making type. Reasons for this are obvious: it is not trade training, and the teacher should be a journeyman operator of these machines in order to teach the work.

In the vocational school it was agreed at the Rochester conference that "typecasting machines have no place in vocational schools on the preapprentice level." Likewise, "Linotypes and Intertypes are not justified unless machine composition is taught to apprentices on a large scale. The objection to a single machine . . . seems to be the purpose to which it is put. Most schools with one machine use it to turn our production work and thus exploit boys for that purpose." Monotypes are placed in the same category.

Teachers who know how to operate these machines will generally not agree with the foregoing findings. Some few say that this is a defense mechanism set up to clutch at any straw to protect their lack of experience in the practice of printing. The writer must confess a prejudice in favor of even one machine in any plant which *must* do production work — probably because he worked on these machines in the trade. It will relieve many boys of tedious hours of unnecessary hand composition of straight matter. There is danger to the administration to add a machine, however, for a teacher who has had experi-

ence on them, because when he leaves the school, it may be difficult to get a teacher with the necessary teacher training who also is a machine operator. And the operation of one of these machines is not picked up like golf or bridge! In general, the critics are right in their view; in isolated cases, they are not.

The writer's vocational plant is now equipped with three Linotype machines, with a full-time teacher in charge. Ten students are scheduled for each class. Three work on machines, and seven on make-up, maintenance, and on practice keyboards. The evening classes run four nights a week with journeymen printers as students. Plans call for the addition of five machines, which will make the course more worth while from a student-load point of view. More than eight machines would make the job too hard for the teacher to keep the machines in running order. A few boys are employed as helpers in linotype departments in the city. The entire student body, upon graduation, will know definitely what a keyboard linecasting machine does, how it operates, and can point to practical operation of the machine. Likewise they will know how to make up linotype material into pages. The setup is similar to the Monotype department. It was suggested at the Rochester conference that the subject of typecasting machines can be taught through the use of "charts, blackboard discussions, model parts, and sample lines. . . ." We do not concur with this view, which adheres too closely to industrial-arts objectives.

### Incidental Equipment

Much incidental equipment is not included in the chart shown with this article. The quantity of each item depends, of course, upon the number of students enrolled. A list of such material follows:

Cans for benzine and oil, and storage can for supplies.
Brushes for cleaning type.
Composing sticks in various sizes, which should be rust resisting or stainless steel.
Galleys, the most usable size of which is the 8¾ by 13 in. likewise rustproof.
Ink spatulas.
Lead and rule cutter for industrial arts, saw for vocational.
Hand miterer for industrial arts, power rotary miterer for vocational.
Stapler for industrial arts, stitcher for vocational.
Numbering machine.
Oily waste cans.
Quoins and quoin keys.
Roller and leader boxes to fit blank California job cases.
Mallets.
Proof planers.
Planers in two sizes.

Equipment which cannot easily be purchased would include a rack for composing sticks, probably made of a piece of plywood, with hooks to hold composing sticks; a similar contrivance for line gauges; bookcases; tables for layout and bindery work; teachers' desks; filing cabinet, etc.

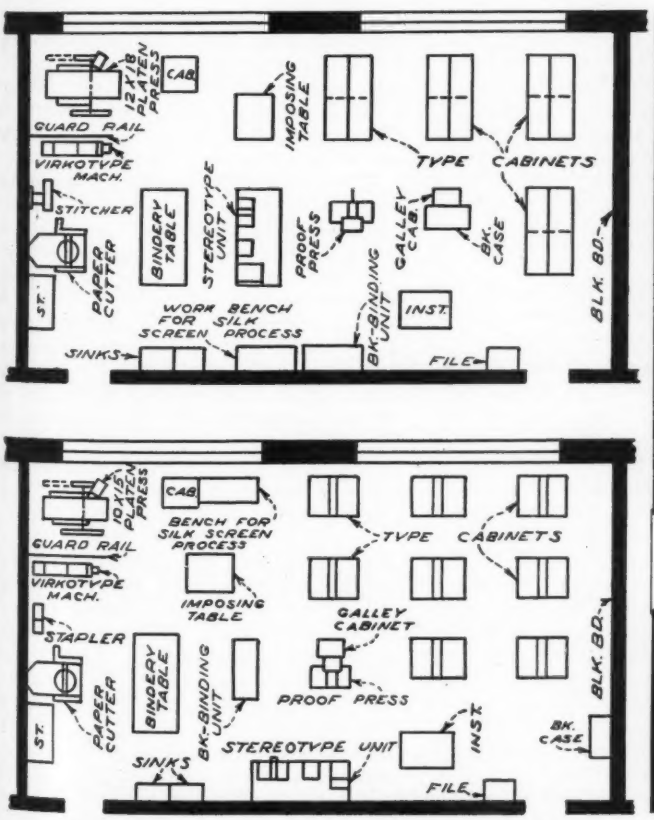
Initial supplies would include:

Gauge pins for presswork.
Line gauges.
Type in various weight fonts and double job fonts.
Printing ink.
Make-ready paste.
Bookbinding glue.
Staples or stitcher wire.
Miscellaneous type such as braces, dashes, fractions, etc.
Leads and slugs.
Brass rule.
Metal furniture.
Paper stock: book papers, both antique and coated; bonds, ledgers, newsprint, blanks, and bristols in various weights, colors, and sizes.

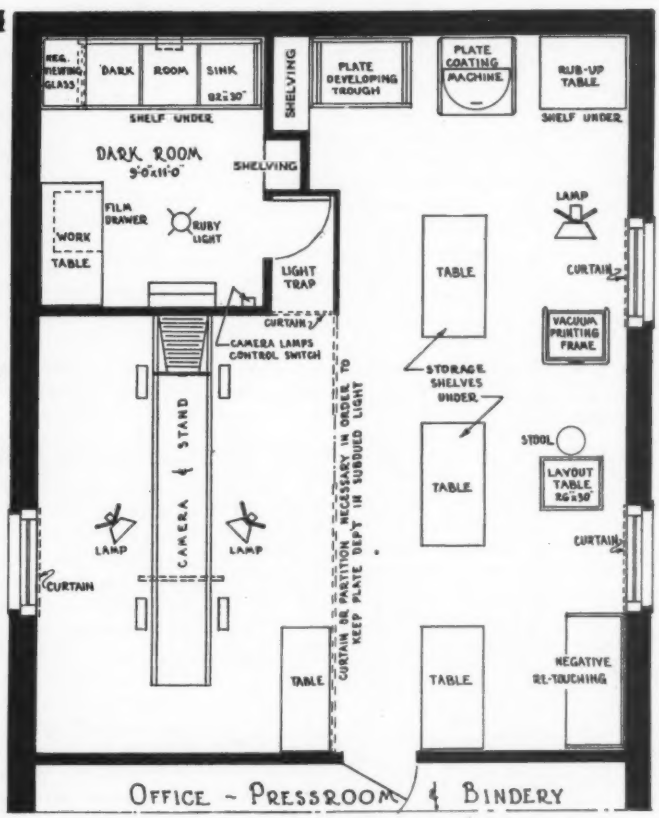
### Placing the Equipment

When laying out new equipment, or in rearranging old equipment for better straight-line education or production, the planner should carefully measure equipment already on the floor, and then get complete specifications of the new equipment to be added. When this data is gathered, the planner can then make paper templates, to a scale of ¼ in. to the foot, and place them on a completed drawing of the room. This will insure against unnecessary moving after the plant has been laid out.

Although the size and shape of the room,




Typical plant arrangement for 16 to 19 industrial-arts students




Typical arrangement of camera and plate-making department

position of windows, etc., are deciding conditions in the placing of equipment, a few general rules may be laid down:

*Presses:* Allow 18 in. minimum between platen presses. Have natural light falling on either side of the press, do not have the worker facing the light or with his back to the light. Cylinder presses should have the delivery end of the press nearest to the light. Allow also for the swing of feeders, and passage for stock trucks.

*Type cabinets:* Arrange at right angles to the source of natural light. Arrange no closer together than 42 in.; or farther apart than 48 in. Centralize saws, proof presses, mitering tables, etc.

*Stockroom* or stock areas should be near the door.

*Roller storage* and ink cabinets should be nearest the presses.

*Teacher's desks* should be near the door, and if possible near the center of the room.

*Lighting:* 100 foot-candles should be on type cases; proofreading, 100 foot-candles; linotype, 50 foot-candles on machine, and 100 on copyboard; presses, 25 foot-candles on presses, 50 on delivery end.

(For equipment chart see page 184)

# State Supervision of Industrial-Arts Education

WILLIAM J. MICHEELS*

(Continued from page 138 of the March, 1942, issue)

Only 11 states (of those cooperating) have published courses of study or syllabuses for industrial arts during the past five years. When visiting in the field the largest group of supervisors spend about an hour with the teachers.

The majority of the supervisors cooperating in this study were connected with the field of trade and industrial education. The age range was from 29 to 60 years with the average supervisor being 45.6 years. The typical supervisor has held office for 6.7 years; has received at least a part of his training at a university; and has earned at least a master's degree, usually attained since 1930. Previous to becoming supervisors, the largest number were either high school principals or superintendents. Generally speaking the trade and industrial-education supervisors have had excellent experience in the skilled trades, but the general-education supervisors have not. A considerable number have had no teaching experience in the field of industrial arts.

Comments from the several supervisors bring to light very interesting phases of individual programs. Parts of these comments are included here, for they help to explain some of the problems that were evident in the findings.

The situation in ——— is similar to that throughout the country — that is, there is little or no organization among the industrial-arts group.

I wish to re-emphasize that my supervision of industrial-arts classes is incidental to complete school visitation.

I believe you have a basis in this for finding out about industrial arts. We are making a special effort to develop young leadership. I am going to use this to guide me in improving my own work.

I am not an industrial-arts supervisor. I visit as many of the departments as possible in both the elementary grades and high school.

Since I am responsible for all departments in the 318 schools in my territory, including elementary grades, I do not have time to check these departments to the extent indicated in this study.

*Regular* is often used in your questions. It will require 25 years for me to make the rounds. No visitation can be regular with me. Conferences and bulletins require much time.

I work in the field of vocational trades and industries and although I always visit the industrial-arts teachers in the schools where we have vocational units it is generally in the manner of a friendly visit rather than a supervisory visit.

The supervisor of trade and industrial education is permitted to devote a portion of his time to the supervision of industrial arts.

All specialized industrial-arts supervision in ——— is done by the vocational trade and industrial supervisors. Only approximately 25 per cent of their time is available for supervision of industrial arts, and the greater portion of that 25 per cent must be devoted to affiliation works for the division of supervision of the state department of education.

I have no official duties with regards to industrial arts. I help when called upon, and suggest departments when needed.

I'm not finishing this as I do not officially supervise industrial arts. We have no one in the state that does.

## Teacher Reaction to State Supervision

The recipients of the major efforts of the state supervisors are the individual teachers in the scattered schools of the state. Accordingly, it became one purpose of this study to sample the reactions of teachers of industrial arts to state supervision in their field. About 50 per cent of the teachers cooperating said that they receive sufficient supervisory help from local sources (superintendent, principal, head of department). The other half reported that they do not and that they would welcome more outside assistance. Three fourths of the teachers who contributed to the study were located in towns which do not have a city supervisor of industrial arts.

Approximately 55 per cent of the teachers stated that they had not been visited by a state supervisory official in the previous year. About 20 per cent reported one visit; 10 per cent two visits; 4 per cent three; 3 per cent four; and about 1 per cent five or more visits. Of the teachers who had received visits from a state supervisor, about 6 per cent stated that he stayed one-half hour or less; 65 per cent reported a visit of one hour; 15 per cent were visited for two hours; 11 per cent said that the supervisor stayed for one-half day; and 3 per cent were visited for an entire day. The teachers were asked whether the activities of the state supervisor had been helpful to them in their teaching. Of the 269 replying, 30 per cent said that the activities of the state supervisor had been helpful to them, while 70 per cent replied *no* to the query.

The responses of the teachers indicated that they, generally, do not receive the amount and type of assistance that they need and would appreciate from the state supervisors. Very few of the teachers are fully aware of the procedures which the supervisors in their individual states carry out. A long list of comments by teachers is included in the text under four headings: (1) those acknowledging assistance; (2) those advancing criticism of present supervision; (3) those expressing desire for a state supervisor; and (4) miscellaneous statements. The nature of these comments is summarized in Table II:

**TABLE II. Summary of Comments of Teachers of Industrial Arts in the Several States Regarding the State Supervisors Who Visit Them**

| | |
|---|---|
| Merely a political job | 3 |
| Pays only a social call | 4 |
| Inspects once a year | 7 |
| Has been helpful | 10 |
| Not very helpful | 14 |
| Have never had a visit | 27 |
| Really need a state supervisor | 29 |
| Should visit more often | 61 |
| No state supervisor | 117 |
| Total | 272 |

*University of Minnesota, Minneapolis, Minn.

| | | Jury of Experts | | | State Supervisors | | Teachers | | |
|---|---|---|---|---|---|---|---|---|---|
| | | + | ? | - | Yes | No | Yes | No | ? |
| | **As a part of his personal supervision, the STATE SUPERVISOR—** | | | | | | | | |
| B 1. | Visits each INDUSTRIAL ARTS department in the state at least once each year | 80 | 15 | 5 | 20 | 80 | 22 | 53 | 45 |
| C 2. | Regularly announces his visits in advance | 48 | 37 | 13 | 22 | 78 | 6 | 50 | 44 |
| A 3. | Keeps a written record of each visit | 90 | 8 | 2 | 74 | 26 | 11 | 12 | 77 |
| A 4. | Sees that all INDUSTRIAL ARTS departments meet the minimum equipment standards set up by the state department | 90 | 7 | 2 | 73 | 27 | 19 | 23 | 58 |
| B 5. | Determines those schools which receive state aid for INDUSTRIAL ARTS | 78 | 8 | 7 | 26 | 74 | 22 | 9 | 69 |
| C 6. | Approves INDUSTRIAL ARTS teachers before permitting them to teach | 52 | 23 | 25 | 50 | 50 | 17 | 34 | 49 |
| A 7. | Regularly calls on city supervisors of INDUSTRIAL ARTS | 89 | 7 | 2 | 65 | 35 | 12 | 15 | 73 |
| A 8. | Works closely with the city supervisors | 96 | 2 | 2 | 75 | 25 | 12 | 13 | 75 |
| C 9. | DOES NOT visit INDUSTRIAL ARTS teachers in those cities which have city supervisors | 13 | 35 | 52 | 29 | 71 | 5 | 17 | 77 |
| C 10. | Requires that each INDUSTRIAL ARTS teacher submit a copy of his course of study to the state department | 50 | 28 | 22 | 18 | 82 | 7 | 53 | 40 |
| B 11. | Is responsible for issuing a state course of study in INDUSTRIAL ARTS | 66 | 15 | 17 | 35 | 65 | 14 | 31 | 55 |
| C 12. | Admonishes teachers who fail to follow the state course of study | 17 | 30 | 53 | 19 | 81 | 5 | 39 | 56 |
| C 13. | Has authority to enforce local teachers to follow the state course of study | 23 | 17 | 55 | 28 | 67 | 8 | 28 | 64 |
| A 14. | Regularly encourages selected schools to introduce experimental INDUSTRIAL ARTS courses | 97 | 3 | - | 59 | 41 | 16 | 14 | 70 |
| A 15. | Encourages selected INDUSTRIAL ARTS teachers to engage in helpful research | 98 | 2 | - | 77 | 23 | 23 | 15 | 62 |
| A 16. | Encourages INDUSTRIAL ARTS teachers to attend summer sessions | 95 | 3 | 2 | 69 | 31 | 31 | 19 | 50 |
| A 17. | Conducts state-wide surveys to determine the kinds and types of INDUSTRIAL ARTS activities needed in the state | 95 | 5 | - | 29 | 71 | 16 | 22 | 62 |
| A 18. | Promotes the formation of clubs of INDUSTRIAL ARTS teachers about the state | 97 | 3 | - | 44 | 56 | 25 | 23 | 52 |
| A 19. | Visits these clubs throughout the year | 91 | 7 | 2 | 40 | 60 | 20 | 22 | 58 |
| A 20. | Holds regular sectional meetings of INDUSTRIAL ARTS teachers about the state | 93 | 5 | 2 | 32 | 68 | 34 | 24 | 42 |
| A 21. | Uses his central office as a clearing house for questions and problems that arise in the teaching of INDUSTRIAL ARTS about the state | 98 | 2 | -0 | 72 | 28 | 24 | 17 | 59 |
| B 22. | Requires a yearly report from each INDUSTRIAL ARTS department | 70 | 22 | 8 | 24 | 76 | 16 | 42 | 42 |
| A 23. | Makes a yearly report to the chief state school officer or state board of education on the status of INDUSTRIAL ARTS in the state | 98 | 2 | - | 32 | 68 | 15 | 7 | 78 |
| | **In his dealings with local school administrators, the STATE SUPERVISOR—** | | | | | | | | |
| A 24. | Presents himself to the administrator before visiting the INDUSTRIAL ARTS department | 95 | 3 | - | 97 | 3 | 34 | 9 | 57 |
| A 25. | Holds a conference with the administrator after visiting the department | 98 | - | 2 | 94 | 6 | 28 | 10 | 62 |
| A 26. | Assists in adapting the INDUSTRIAL ARTS courses to the needs of the students and the facilities of the school | 90 | - | 8 | 85 | 15 | 30 | 19 | 51 |
| A 27. | Assists in selecting and purchasing INDUSTRIAL ARTS equipment | 85 | 8 | 5 | 52 | 48 | 15 | 38 | 47 |
| C 28. | Recommends the type of extra-curricular duties which INDUSTRIAL ARTS teachers should have | 35 | 45 | 20 | 34 | 66 | 7 | 37 | 56 |
| A 29a. | Assists the administrators with their INDUSTRIAL ARTS supervisory problems | 98 | 2 | - | 89 | 11 | 21 | 14 | 65 |
| A 29. | Promotes INDUSTRIAL ARTS classes in adult education programs | 90 | 8 | 2 | 37 | 63 | 21 | 16 | 63 |
| B 30. | Assists in the establishment of summer handicraft courses | 81 | 15 | 7 | 17 | 83 | 6 | 23 | 71 |
| B 31. | Recommends outstanding INDUSTRIAL ARTS teachers for advancement | 86 | 12 | 3 | 71 | 29 | 10 | 14 | 68 |
| A 32. | Visits schools which *do not* have INDUSTRIAL ARTS departments and promotes the introduction of such courses | 95 | 3 | 2 | 79 | 21 | 17 | 8 | 75 |
| A 33. | Passes on the plans for INDUSTRIAL ARTS departments in new buildings | 88 | 9 | 7 | 65 | 35 | 16 | 15 | 69 |
| C 34. | Requires that a drawing be submitted of any major changes to be made in the INDUSTRIAL ARTS departments | 49 | 23 | 28 | 9 | 91 | 6 | 30 | 64 |
| C 35. | Approves these changes before they can be put into effect | 43 | 32 | 25 | 9 | 91 | 5 | 27 | 68 |
| A 36. | Assists in reorganizing INDUSTRIAL ARTS departments | 93 | 7 | - | 65 | 35 | 24 | 17 | 59 |
| A 37. | Assists in designing INDUSTRIAL ARTS departments for new buildings | 95 | 3 | 2 | 64 | 36 | 23 | 15 | 62 |
| A 38. | Participates in the state and sectional meetings of local school administrators | 98 | 2 | - | 85 | 15 | 28 | 10 | 62 |
| C 39. | Requires a yearly report on the INDUSTRIAL ARTS department, from the administrator | 42 | 44 | 12 | 26 | 74 | 13 | 70 | 17 |
| | **While visiting and observing the INDUSTRIAL ARTS teacher the STATE SUPERVISOR—** | | | | | | | | |
| B 40. | Has a written list of objectives which he attempts to meet | 77 | 12 | 8 | 29 | 71 | 6 | 22 | 62 |
| A 41. | Critically notes the attitude of the pupils | 88 | 5 | 7 | 89 | 11 | 26 | 17 | 63 |
| B 42. | Requests to see the teacher's course of study | 80 | 15 | 5 | 48 | 52 | 10 | 36 | 64 |
| C 43. | Asks for the objectives of that day's lesson | 53 | 36 | 12 | 27 | 73 | 6 | 39 | 55 |
| B 44. | Asks to see the records kept by the teacher | 71 | 28 | 7 | 50 | 50 | 7 | 41 | 52 |
| C 45. | Gives a demonstration to the class | 25 | 32 | 23 | 15 | 85 | 2 | 47 | 51 |
| C 46. | Lectures to the class on INDUSTRIAL ARTS subjects | 15 | 35 | 50 | 13 | 87 | 2 | 46 | 52 |
| C 47. | Questions the students on their knowledge of shop safety | 48 | 37 | 15 | 33 | 67 | 9 | 32 | 58 |
| B 48. | Distributes teaching aids | 85 | 10 | 5 | 45 | 55 | 11 | 39 | 50 |
| C 49. | Does demonstration teaching to show the teacher particular teaching points | 47 | 30 | 23 | 15 | 85 | 3 | 46 | 51 |
| B 50. | Critically notes the personal appearance of the teacher | 78 | 17 | 5 | 94 | 6 | 14 | 19 | 67 |
| B 51. | Critically notes the teacher's use of English | 85 | 10 | 5 | 85 | 15 | 12 | 19 | 69 |
| | **In each INDUSTRIAL ARTS department visited the STATE SUPERVISOR critically checks—** | | | | | | | | |
| A 52. | The general appearance of the shop | 95 | - | 5 | 92 | 8 | 32 | 12 | 56 |
| A 53. | The first aid equipment | 95 | - | 5 | 77 | 23 | 16 | 22 | 62 |
| A 54. | The ventilating equipment | 93 | 2 | 5 | 77 | 23 | 17 | 20 | 63 |
| A 55. | The lighting in the shop | 93 | - | 5 | 83 | 17 | 23 | 16 | 61 |
| A 56. | The condition of tools and machines | 91 | 2 | 7 | 80 | 20 | 30 | 14 | 56 |
| A 57. | The arrangement of equipment | 93 | - | 7 | 86 | 14 | 26 | 16 | 58 |
| A 58. | The safety devices being used | 98 | - | 5 | 84 | 16 | 26 | 15 | 59 |
| A 59. | The fireproof qualities of the cabinet for storing finishing materials | 93 | - | 7 | 74 | 26 | 17 | 21 | 62 |
| A 60. | All new INDUSTRIAL ARTS equipment that has been installed since his last visit | 87 | 3 | 7 | 77 | 23 | 20 | 19 | 61 |
| A 61. | The extent to which the course objectives are being met | 90 | 2 | 8 | 51 | 49 | 13 | 25 | 62 |
| A 62. | The instructional aids being used | 92 | 3 | 5 | 71 | 29 | 22 | 19 | 59 |
| A 63. | The sequential arrangement of courses being offered | 87 | 5 | 8 | 60 | 40 | 14 | 24 | 62 |
| A 64. | The size of classes in relation to the equipment available | 90 | 5 | 5 | 77 | 23 | 22 | 20 | 58 |
| A 65. | The attitude of the students toward their work | 95 | - | 5 | 86 | 14 | 23 | 17 | 60 |
| A 66. | The attitude of the students toward the teacher | 93 | 2 | 5 | 83 | 17 | 22 | 18 | 60 |
| B 67. | Uses standard check sheets for checking the above | 79 | 12 | 7 | 17 | 83 | 5 | 28 | 67 |
| | **After filling out these check sheets the STATE SUPERVISOR—** | | | | | | | | |
| A 68. | Files them in the state supervisor's office | 85 | 5 | 5 | 34 | 66 | 2 | 10 | 88 |
| B 69. | Gives a duplicate to the teacher | 91 | 12 | 2 | 4 | 96 | - | 43 | 57 |
| B 70. | Gives a duplicate to the principal or superintendent | 82 | 10 | 3 | 14 | 86 | 3 | 22 | 75 |
| A 71. | Uses them in personal conference | 86 | 8 | 3 | 33 | 67 | 4 | 25 | 71 |
| A 72. | **During the individual conference with the INDUSTRIAL ARTS teacher the STATE SUPERVISOR—** Suggests readings which will help in solving problems that have arisen | 93 | 3 | 2 | 60 | 32 | 13 | 33 | 54 |
| A 73. | Suggests field trips which might be taken | 90 | 10 | - | 70 | 30 | 13 | 36 | 51 |
| A 74. | Discusses the various check sheets he has filled out | 90 | 5 | 5 | 29 | 71 | 3 | 41 | 56 |
| A 75. | Suggests improvements which might be made in the shop | 97 | 3 | - | 86 | 14 | 32 | 18 | 50 |
| A 76. | Helps the teacher in selecting interesting and appropriate projects | 88 | 12 | - | 73 | 27 | 14 | 34 | 52 |
| A 77. | Discusses the related information being presented to the INDUSTRIAL ARTS classes | 91 | 7 | - | 73 | 27 | 15 | 30 | 55 |
| C 78. | Discusses any disciplinary cases which the teacher may wish to bring up | 44 | 37 | 17 | 67 | 33 | 14 | 29 | 57 |
| A 79. | Commends the teacher on any good work he has done | 97 | 3 | - | 94 | 6 | 32 | 18 | 50 |
| B 80. | Discusses any personal memorandums which might affect the work of the teacher | 79 | 13 | 8 | 74 | 26 | 11 | 35 | 54 |
| A 81. | Helps the local INDUSTRIAL ARTS teacher to interpret the state course of study | 87 | 8 | 5 | 59 | 41 | 17 | 29 | 54 |
| B 82. | Questions the teacher as to the objectives of the lessons being taught | 69 | 23 | 8 | 59 | 41 | 9 | 35 | 56 |
| B 83. | Assists the teacher in filling out record or report forms with which he is having difficulty | 80 | 15 | 5 | 48 | 52 | 11 | 34 | 55 |
| A 84. | Assists the teacher in better organizing his course of study | 96 | 2 | 2 | 73 | 27 | 17 | 31 | 52 |
| A 85. | Helps the individual teacher to see the correlative possibilities existing between INDUSTRIAL ARTS and the other subjects | 93 | 5 | 2 | 76 | 24 | 17 | 30 | 53 |
| A 86. | Encourages the local teacher to use the new industrial products appearing on the market | 89 | 8 | 3 | 74 | 26 | 16 | 29 | 55 |
| A 87. | Discusses special methods of teaching INDUSTRIAL ARTS | 95 | 3 | 2 | 64 | 36 | 16 | 31 | 53 |
| A 88. | Discusses the type of assignments the teacher is giving | 83 | 10 | 7 | 61 | 39 | 7 | 36 | 57 |
| B 89. | Suggests remedial measures which might be followed in handling certain students | 76 | 17 | 7 | 69 | 31 | 8 | 35 | 57 |
| B 90. | Discusses the lesson plans of the INDUSTRIAL ARTS teacher | 83 | 7 | 10 | 52 | 48 | 9 | 35 | 56 |
| A 91. | Discusses and promotes the "Home Workshop" idea with the teacher | 92 | 5 | 3 | 27 | 73 | 12 | 33 | 55 |
| | **After a visit to a local INDUSTRIAL ARTS department the STATE SUPERVISOR—** | | | | | | | | |
| C 92. | Makes a written report to the teacher | 65 | 35 | 7 | 18 | 82 | 8 | 47 | 31 |
| B 93. | Makes a written report to the principal or superintendent | 78 | 18 | 2 | 89 | 41 | 11 | 13 | 76 |
| C 94. | Makes a written report to the local board of education | 15 | 65 | 35 | 18 | 82 | 3 | 17 | 80 |
| C 95. | Makes a written report to the state superintendent | 45 | 30 | 20 | 38 | 62 | 4 | 9 | 87 |
| C 96. | Uses a standard form in making these reports | 59 | 25 | 16 | 24 | 76 | 3 | 18 | 88 |
| C 97. | Gives the INDUSTRIAL ARTS department a numerical rating | 27 | 35 | 33 | 3 | 97 | 4 | 14 | 82 |
| C 98. | Sends this rating to the teacher | 27 | 25 | 55 | 3 | 97 | 1 | 48 | 86 |
| C 99. | Sends this rating to the principal or superintendent | 26 | 34 | 51 | 3 | 97 | 4 | 17 | 79 |
| C 100. | Files this rating with the state department | 36 | 32 | 30 | 13 | 87 | 2 | 10 | 88 |
| C 101. | Uses a scale to rate the teacher | 43 | 25 | 30 | 16 | 84 | 3 | 19 | 78 |
| C 102. | Sends this rating to the teacher | 38 | 33 | 27 | 6 | 94 | 1 | 48 | 87 |
| C 103. | Sends this rating to the principal or superintendent | 37 | 27 | 33 | 6 | 94 | 3 | 17 | 80 |
| C 104. | Files this rating with the state department | 42 | 27 | 27 | 13 | 87 | 4 | 10 | 86 |
| | **As a service to INDUSTRIAL ARTS teachers new on the job the STATE SUPERVISOR—** | | | | | | | | |
| A 105. | Spends the Fall months in visiting those who are experiencing their first teaching | 90 | 5 | 2 | 34 | 66 | 14 | 29 | 57 |
| A 106. | Spends the Fall months in meeting with groups of new teachers about the state | 92 | 5 | - | 21 | 79 | 6 | 28 | 64 |
| A 107. | Sends out a printed list of helpful suggestions** | 88 | 7 | 2 | 16 | 84 | 3 | 38 | 59 |
| | **As a service to INDUSTRIAL ARTS teachers the STATE SUPERVISOR prepares and sends to them—** | | | | | | | | |
| A 108. | Notices of professional books of interest to INDUSTRIAL ARTS teachers | 95 | 3 | 2 | 32 | 68 | 8 | 47 | 45 |
| A 109. | Notices of new shop books appearing on the market | 92 | 8 | - | 29 | 71 | 7 | 47 | 46 |
| A 110. | References for related informational material | 92 | 6 | - | 40 | 60 | 9 | 48 | 43 |
| A 111. | Supplementary reading lists on the various occupations | 94 | 3 | 3 | 37 | 63 | 6 | 46 | 48 |
| A 112. | Descriptions and illustrations of new and interesting projects he has seen on his visits | 91 | 7 | 2 | 34 | 66 | 7 | 48 | 45 |
| A 113. | Descriptions of effective instructional aids he has encountered on his visits | 95 | 3 | - | 32 | 68 | 8 | 46 | 46 |
| A 114. | Manipulative tips he has picked up on his visits | 88 | 7 | 2 | 33 | 67 | 11 | 44 | 45 |
| A 115. | Descriptions of effective new teaching procedures he has encountered on his visits | 92 | 8 | - | 27 | 73 | 8 | 46 | 46 |
| A 116. | Information he has received at conferences and conventions | 90 | 8 | - | 39 | 61 | 12 | 42 | 46 |
| A 117. | Reports on significant research projects of interest to INDUSTRIAL ARTS teachers | 94 | 8 | 2 | 29 | 71 | 7 | 45 | 48 |
| B 118. | A regular INDUSTRIAL ARTS news letter | 80 | 13 | 5 | 6 | 94 | 2 | 52 | 46 |
| A 119. | Information about new industrial products appearing on the market | 88 | 10 | 2 | 19 | 81 | 5 | 48 | 47 |
| B 120. | Exhibits of an INDUSTRIAL ARTS nature which are sent from school to school | 81 | 13 | 5 | 13 | 87 | 2 | 52 | 46 |
| | **As a further service to INDUSTRIAL ARTS departments, the STATE SUPERVISOR—** | | | | | | | | |
| B 121. | Arranges with manufacturers to send instructional materials to schools which request such | 78 | 12 | 10 | 48 | 52 | 8 | 38 | 87 |
| C 122. | Compiles annual price lists of INDUSTRIAL ARTS supplies and equipment | 57 | 33 | 10 | 6 | 94 | 3 | 41 | 56 |
| B 123. | Arranges for the cooperative buying of INDUSTRIAL ARTS *equipment* on the part of small schools | 66 | 24 | 10 | - | 100 | 3 | 34 | 59 |
| B 124. | Arranges for the cooperative buying of INDUSTRIAL ARTS *supplies* on the part of small schools | 67 | 23 | 8 | - | 100 | 2 | 30 | 62 |
| A 125. | Provides the local teachers with suggestive outlines for INDUSTRIAL ARTS courses | 92 | 6 | 3 | 53 | 47 | 16 | 35 | 49 |
| B 126. | Sends to all teachers the aims and objectives of each type of INDUSTRIAL ARTS course taught in the state | 80 | 13 | 7 | 22 | 78 | 11 | 41 | 48 |
| C 127. | Sends out standardized INDUSTRIAL ARTS tests | 58 | 27 | 12 | 3 | 97 | 1 | 51 | 48 |
| C 128. | Collects the results of these tests | 41 | 52 | 22 | 3 | 97 | 1 | 50 | 49 |
| A 129. | Sends out safety directions from time to time | 88 | 12 | - | 28 | 72 | 7 | 43 | 50 |
| B 130. | Provides INDUSTRIAL ARTS teachers with shop record forms that have proven effective and efficient | 82 | 13 | 5 | 23 | 77 | 5 | 49 | 46 |
| B 131. | Assists local teachers in planning field trips to interesting industrial plants and projects about the state | 82 | 16 | 3 | 23 | 78 | 4 | 48 | 48 |
| | **As a part of his supervisory practices the STATE SUPERVISOR—** | | | | | | | | |
| B 132. | Collects pictures and drawings of local INDUSTRIAL ARTS projects | 83 | 12 | 5 | 41 | 59 | 7 | 35 | 60 |
| A 133. | Collects pictures and drawings of local INDUSTRIAL ARTS shop layouts | 93 | 5 | 2 | 47 | 53 | 7 | 30 | 63 |
| B 134. | Asks teachers to send in illustrations of INDUSTRIAL ARTS projects that have been made during the year | 85 | 12 | 3 | 37 | 63 | 4 | 45 | 53 |
| B 135. | Uses a still or motion picture camera to record both good and bad INDUSTRIAL ARTS projects and practices which he encounters | 77 | 19 | 10 | 18 | 82 | 2 | 42 | 56 |
| B 136. | Uses a still or motion picture camera to record both good and bad shop layouts | 81 | 9 | 8 | 67 | 33 | 1 | 41 | 58 |
| B 137. | Carries a motion picture projector with him to show pictures of interest to INDUSTRIAL ARTS classes | 65 | 17 | 15 | - | 100 | - | 49 | 51 |
| B 138. | Uses his central office as a clearing house for motion pictures to be sent to INDUSTRIAL ARTS teachers about the state | 75 | 12 | 10 | - | 100 | 1 | 45 | 54 |
| | **The STATE SUPERVISOR makes a practice of REGULARLY visiting the INDUSTRIAL ARTS teacher-trainees while on his trips about the state and—** | | | | | | | | |
| B 139. | Critically checks the condition of the shop equipment | 82 | 10 | 8 | 58 | 42 | 15 | 24 | 61 |
| B 140. | Critically checks the variety of the shop equipment | 94 | 6 | 8 | 53 | 47 | 16 | 24 | 62 |
| B 141. | Critically checks the safety devices being used | 83 | 7 | 10 | 56 | 44 | 15 | 25 | 62 |
| A 142. | Critically checks the variety of courses offered | 87 | 5 | 8 | 56 | 44 | 15 | 25 | 62 |
| A 143. | Makes a regular practice of speaking before INDUSTRIAL ARTS seniors in teacher-training institutions for the purpose of orientation, guidance, and advice | 87 | 8 | 5 | 26 | 74 | 5 | 27 | 68 |
| | **In carrying out the duties of his office, the STATE SUPERVISOR—** | | | | | | | | |
| A 144. | Carries on a definite publicity campaign in promoting INDUSTRIAL ARTS about the state | 93 | 3 | 5 | 28 | 72 | 11 | 25 | 64 |
| A 145. | Organizes or assists in state-wide INDUSTRIAL ARTS radio broadcasts | 94 | 3 | 3 | 22 | 78 | 4 | 31 | 65 |
| A 146. | Prepares regular INDUSTRIAL ARTS news items and sends them to the local papers | 86 | 7 | 7 | 3 | 97 | 7 | 33 | 60 |
| A 147. | Appears before service clubs and talks on INDUSTRIAL ARTS in the state | 93 | 5 | 2 | 41 | 59 | 15 | 17 | 66 |
| A 148. | Writes articles on INDUSTRIAL ARTS for the state education journal | 98 | 2 | - | 28 | 72 | 17 | 21 | 62 |
| A 149. | Calls together outstanding INDUSTRIAL ARTS teachers to work on publications for the whole state | 88 | 7 | 5 | 44 | 56 | 18 | 28 | 63 |
| A 150. | Serves as an advisory member of a state-wide INDUSTRIAL ARTS curriculum committee | 92 | 3 | 5 | 48 | 52 | 22 | 11 | 67 |
| A 151. | Is an ex-officio member of the executive board of the INDUSTRIAL ARTS section of the state teachers association | 90 | 8 | 5 | 28 | 72 | 16 | 11 | 73 |
| A 152. | Cooperates in establishing and promoting a state-wide INDUSTRIAL ARTS planning committee | 93 | 2 | 2 | 39 | 61 | 15 | 13 | 73 |
| A 153. | Makes a definite policy of calling in INDUSTRIAL ARTS teacher-trainees to serve with teachers when planning a state-wide program | 95 | - | 2 | 53 | 47 | 12 | 13 | 75 |

TABLE I. Percentage comparison of reactions of jury members, state supervisors and industrial-arts teachers to procedures of state supervision

*A — close agreement; B — some disagreement; C — considerable disagreement; (+) — desirable; (?) — of doubtful desirability; (—) — undesirable. State supervisors do or do not carry out the procedures indicated; teachers say supervisors do or do not, or that they are not informed.

**Especially intended for beginning industrial-arts teachers.

In the belief that readers would be interested in the reactions of teachers to state supervision, the following sample comments are included under the four headings previously mentioned above:

#### Assistance Acknowledged

This threefold *job* is more work and responsibility than should be expected from one man. In spite of the above-mentioned handicap our industrial-arts state supervisors in the past have been able to build up a practical industrial-arts program in most high schools in this state.

Our state supervisor is not a supervisor of industrial arts, but a supervisor in charge of all secondary teachers in the state. His comments are very helpful.

Very helpful. The state supervisor can oftentimes help in improving working conditions.

Very favorable.

I have profited very materially from the work and suggestions of our state supervisor. He has been instrumental in assisting me with recommendations to my superintendent pertaining to the installation and development of our department.

Greatly improved during the past two years.

Our state supervisor is a good fellow and would willingly cooperate with any teacher.

#### Criticisms Advanced

On the whole it could be of much more help to my group.

In all my 15 years' teaching experience I have never seen a state supervisor in my shop.

I want to make it clear to you that my state supervisor has never visited me, consequently I could only check the third column regarding his visits to the school.

It has not reached me often enough to comment.

There is a lack of state-wide co-ordination in industrial arts.

We have practically no state supervision. No suggestions and no criticism.

We have very little or no state supervision. Although we have a supervisor, his only contact with teachers is through courses given by him. I certainly hope that someday we might hear more about it.

Just a political job and in most cases said supervisor can't handle a job of teaching successfully, hence the reason for playing politics. Useless under our present system. Just a vote getter by giving all schools a good rating regardless.

In my five years' experience the state supervision has been utterly valueless. I have felt very strongly that the state department should serve as a central agency and continually disseminate ideas, information and the like to all industrial-arts teachers in the state.

Sadly lacking as far as Negro schools are concerned.

I have started four new industrial-arts shops in this state and in none of them have had any help or approval from the state department.

His intentions are no doubt very good, but he is not an industrial-arts man. He is an ex-superintendent and was a good one. He only knows industrial arts from the outside and I am not sure of that. His job is a political one and his chief interest is holding it.

Although vocational (Smith-Hughes) work is well supervised by the state, industrial-arts work is left much to its own resources.

State supervision as far as I am concerned on my job does not exist. I was criticized for calling manual training industrial arts. This state is more interested in upholding stupid laws than it is upon making progress in *manual training*.

#### Desire for a State Supervisor

I would like to see the state hire a supervisor. I feel that I could use a lot of help and suggestions and it would serve to keep the courses aiming in the same direction.

I think that a state supervisor of industrial arts would be a splendid improvement for our state.

We need such a source of advice and supervision.

A state supervisor of industrial arts is needed and much discussion leading to such an office has taken place. It is hoped that it will be established in the near future.

We do need a co-ordinator to bridge the gaps between the various schools, to prevent omissions and repetitions.

We need a state supervisor of industrial arts. If the proper setup be arranged, industrial arts would prosper in this state. As it is we are all fighting for existence.

I greatly feel the need for state supervision.

#### Miscellaneous Statements

The state supervisor is O.K. but he sure has a lot of work to do. I think that a state supervisor is fine but he has too large an area to cover. I think they can do a lot to help the industrial-arts teachers.

State inspectors both of schools and fire marshall's office have visited my classes. Their visits are short and their recommendations are good. The school tries as far as possible to follow these recommendations.

Needs improving. Visits should be regular and office should be more active if we have one.

The state supervisor pays a short pleasant visit. He says he comes to get ideas. He wants to see what I am doing out of the ordinary. He never has criticized the work, methods or visible outcomes.

I believe that one of the main reasons why we as industrial-arts teachers do not have the benefits of better supervision is due to the demands placed upon our supervisor.

So far as I know, a state supervisor of industrial arts in ——— does not exist. Such a person or office would be superfluous, and very useless. The industrial-arts supervisor for the city of ——— does a good thorough job. It would be a waste of money to have a state supervisor too.

### General Supervisory Qualifications

Eighty-one per cent of the chief state school officers and jury members prefer that each state have a special supervisor of industrial arts. They think that he should be between 30 and 40 years of age when selected, and that he should have the master's degree at least. Opinion differs somewhat as to the number of years of teaching experience that such an official should have had. One strong group feels that from four to six years of such experience are sufficient, while another sizable group would exact 10 years as the minimum.

Ninety-two per cent think that such experience should have been gained in the secondary school, although some within this group feel that elementary school and college teaching should also have been experienced. If the prospect has been head of an industrial-arts department, or a city supervisor of industrial arts, or preferably both, he will meet the administrative and supervisory qualifications deemed necessary.

In his college work the major amount of concentration should have been in the field of industrial arts. In the order named the following fields should have received next consideration: supervision, general secondary education, and administration. A slight majority of the total group think that he should have special training in research, although the opinions of the jury of experts and the chief state school officers differ slightly on this point. According to 65 per cent of the total group, the supervisor should have had from one to four or more years of occupational experience other than education, and, if possible, this experience should have been gained in several occupations.

### Interpretations

1. There is definite need that the state supervision of industrial arts, as a distinct curriculum area, be more adequate and complete, in view of the near universality of such instruction and the unique assistance needed by teachers and administrators. A significant number of industrial-arts teachers, as indicated by the sampling in the study, would appreciate the services of a supervisor of such specific and lone responsibility.

2. A curious and defeating situation exists as to the state supervision of industrial arts. State supervisors of trade and industrial education are now most nearly qualified to render, and many of them do render, assistance on industrial-arts programs and problems. They have the requisite technical background and point of view. Yet, industrial arts, being a phase of general education, requires a more general type of supervision. Both vocational and general supervisors could make contribution to the meeting of needs, but the generalization is warranted from the data presented here that, in most states, sufficient help is not received from their combined efforts. Each of these state officials now has duties precluding services desired by and born of the needs of industrial-arts teachers employed in large numbers in most states.

3. The training and experience of the present state high school supervisors is generally not of a kind to suggest or to guarantee effective and efficient supervision in this specialty. The findings indicate the need for more officials thoroughly versed as to the aims and problems of both general education and industrial-arts education. This combination is one not difficult of finding or of attainment. The nation now has hundreds of men so qualified and most of the states should establish the position of *state supervisor of industrial arts*. Exceptions may well occur in

certain states of comparatively low population, where combination positions would seem to be justified. This study reveals that most of the teachers concerned, as well as many administrators, are aware of the benefits to be attained through the service of a special state supervisor of industrial arts. Whatever trends are noticeable are in the direction of the appointment of such officials.

4. State supervisors of trade and industrial education are, generally, unable to divide their time to the end of adequate attention to the needs and interests of industrial-arts teachers within their states. Undoubtedly, the supervisors would welcome appointment of a co-ordinate official and would cooperate closely with him.

5. No standard patterns are noticeable as to the type of assistance given industrial-arts teachers by present state supervisory officials throughout the country. With four exceptions, each of the procedures listed for extensive and varied reaction is carried out by some state supervisors and not by others. A significant number of those supervisory procedures rated desirable by competent educators are not carried out by a majority of the state supervisors who visit industrial-arts teachers. Much improvement is possible in this respect.

6. There is need for more intensive and extensive study of the qualifications and activities of the state supervisors who visit industrial-arts teachers. In connection with a curriculum area so similar in most respects, throughout a state and the nation, there is justification for a considerable degree of standardization.

7. There is need for more written expression concerning the objectives and practices of state supervision as applied to the field of industrial-arts education. The literature of industrial education presents a distinct gap in this important phase.

8. State supervision of industrial arts needs professionalization. No evidence was found of the formal association of such officials nor of programs and conferences arranged by them at large educational conventions. The cooperative discussion of the plans and problems of this area is evidenced by no group comparable to those of the state directors of vocational education, state supervisors of trade and industrial education, trade school principals, industrial teacher-trainers, and the like.

### Recommendations

As a final result, and in terms of the findings of this study, it is possible to recommend specific measures leading toward improved practices in the state supervision of industrial arts, and to suggest further researches which will aid in clarifying the issues now existing in this field.

1. A state supervisor of industrial arts should be appointed in each of the states for the purpose of co-ordinating the aims and efforts of this particular field of education. This field, peculiarly, is general in nature yet directly related to the specific field of trade and industrial education. In states where population deficiencies preclude the appointment of such a full-time official, provision should be made for a combined position which permits of the efficient supervision of industrial arts in conjunction with the performance of other prescribed duties.

2. It is strongly recommended that national and state-wide groups give of their material and editorial resources for further study, discussion, and clarification of the programs and problems of state supervision of industrial arts. There should be a distinct and direct effort in the direction of bridging the gap in the literature of this phase of industrial education. The National Association of Industrial Teacher-Trainers, the Chief State School Officers, the Manual Arts Conference of the Mississippi Valley, the Industrial-Arts Section of the American Vocational Association, the American Industrial-Arts Association, State Associations of Industrial-Arts Teachers — these are typical organizations which could initiate and give continual impetus to such a movement.

3. Local, state, and national groups should cooperate in clarifying the type of supervisory relationships which *ought to* exist between the state supervisors of trade and industrial education and industrial-arts teachers. The findings of this study reveal a heterogeneity of practices and, concurrently, a definite desire on the part of industrial-arts teachers to know what they might expect from such supervisors.

4. Industrial-arts teachers should be more adequately and more definitely informed by their state departments of education as to the type of supervisory help they can expect from such agencies. If nothing more, bulletins such as "The Industrial-Arts Teachers and His Relation to the State Department of Education," or "What the Industrial-Arts Teacher Can Expect from State Supervisory Officials" would help to clarify prevalent questions noted in this study. If teachers of industrial arts are to be visited by state department officials, it would seem logical and fruitful for them to know the nature and purpose of such visits.

5. It is recommended that state department of education officials make concentrated efforts to promote, establish and visit clubs of industrial-arts teachers in different sections of their states. Such clubs, established for the purpose of discussing and working upon common problems, would help to satisfy a need expressed by many of the teachers sampled in this study.

6. Each state, not now doing so, should establish a news letter or similar publication for the benefit of industrial-arts teachers. The purpose of such a publication would be to provide services which are vital to the most effective teaching of industrial arts and which the teachers do not presently receive from other sources in the state. Such services would be similar to those mentioned in items 108 through 120 in the check list included as a part of this study.

7. It is recommended that further study be made of the semantic propensity of the term *state supervisor*. There is some question as to whether the term *supervisor* adequately describes the activities and duties that should be expected of such an official. One cooperator in the study suggested the term *evaluator;* another submitted *co-ordinator,* adding that co-ordination is defined as *harmonious adjustment or functioning*. The nature and spirit of the activities of this official need clarification, especially in the minds of teachers.

8. It is recommended that more detailed research be made concerning the state supervision of industrial arts. We need, for example, a day-by-day analysis of the activities of state supervisors who visit industrial-arts teachers, a comprehensive study of the records used and the reports made by such officials, an examination and evaluation of the techniques used in teacher conferences, a report on standard check sheets which might be used to advantage by state supervisors, an investigation of office assistance and budget allotments for such supervisory services, and a study of the reactions of local administrators to state supervisory help. Each of these possible researches, to mention only a few, would aid in presenting a more accurate picture of the activities and possibilities of state supervision for industrial arts.

9. Definite need exists for a careful study of the personal qualities which characterize successful and competent state supervisors who visit industrial-arts teachers.

10. Intensive and delimited researches on the state supervision of industrial arts are needed. Studies similar to the one herein presented, but based on the aims of supervision as outlined by the individual states and presenting detailed findings for such limited areas would be very helpful. They would make possible definite proposals in terms of the specific needs and requirements of industrial-arts supervision in each of the states.

11. Additional researches should be conducted for the purpose of verifying or denying the conclusions expressed as a result of the study which has here been reported.

12. The United States Office of Education has shown special interest in industrial-arts education and may well be encouraged to increase its services to this field. It might act as a clearing agency, looking to the establishment of more state supervisory positions and clarifying the functions and relationships of such positions. It might, logically, exert its influence in sponsoring federal aid to this field in view of the fading line of demarcation between the general and vocational aspects of industrial education.

## THE HAND

"It is worth remembering that the Hand is one of our principal organs of knowledge. In ordinary academic training we employ *two* organs mostly — the *eye* to read and the *ear* to hear. If you understand and remember — better! But, add a *third* organ, the Hand — anything that involves the element of action — and the vital character of the fact is the more deeply engraved on the understanding and memory. Work at a thing in any sphere until you can do it well and you know it forever."

No man can feel himself alone,
The while he bravely stands,
Between the best friends ever known,
His two good, honest hands.

— *Nixon Waterman.*

Courtesy of the Wisconsin Industrial Arts Association.

# INDUSTRIAL ARTS AND VOCATIONAL EDUCATION

John J. Metz, Editor

## Youth, the School, and the Present

Dr. Henry Dean Hill of the University of Kentucky, in a broadcast from War Memorial Opera House, San Francisco, Calif., on February 26, summarized the deliberations of the delegates who had attended the American Association of School Administrators, and called attention, among other things, to the fact that the country in this emergency was looking to the schools for youth well versed in the sciences, in engineering, and in technical skill. This means that all teachers in the secondary schools must do their utmost to induce those students who possess the proper aptitudes, to prepare themselves adequately so that the flow of trained manpower may be prepared to fill the managerial and production positions now begging for applicants because of lack of properly trained men.

He also called attention to the accelerated tempo introduced in many universities because of wartime conditions, to enable students to finish four-year courses in three years. This helps boys and girls to prepare themselves properly for a professional life, and yet gives them an opportunity to do their share in rendering military or defense service.

He emphasized also that the school must stand ready to give information and guidance to those who are between the ages of 17 and 20, so that these young people may enter the wartime services for which they are best fitted.

While pointing out that planes must be built and technicians trained, he did not forget to mention also that crops must be harvested. This last is important if the war is to be carried on successfully. It must not be forgotten, however, that crops must be planted before they can be harvested. With reduced manpower on the farms, the schools may probably do much good by encouraging their students who have reached a suitable age to partake of that strenuous, yet soul satisfying activity known as working on the farm. The city youth who spends his first summer as a hired hand on a farm, may not become enamored with agricultural life, yet he will gather much knowledge about nature and growing things, acquire new health and strength, and above all, he will be helping in a major way, to prepare America for victory.

To give high school students an opportunity to work on the farm both at planting and at harvest time may mean that many adjustments will have to be made in school hours and in the school year. It is another problem to be studied. The suggestion may have some value, and with some planning an accelerated high school course may prove as beneficial as the accelerated university courses promise to do.

## An Opportunity for the Industrial-Arts Shop

The plan sponsored by the United States Office of Education and the Navy Bureau of Aeronautics, to have high school students make five hundred thousand accurate scale models of airplanes for use in giving student pilots and civilian spotters a readiness at differentiating between the planes of the allies and those belonging to the enemy, seems to have much in its favor.

Since these planes must all be built to an accurate scale, the assignment to the schools assumes the proportion of a real challenge. The students, too, will derive the satisfaction of doing exacting work for a patriotic cause.

Authoritative drawings and plans, together with educational and informational material, are already being distributed. The schools interested should get behind this movement at once. The plan does not mean mass production of just one or a few models. The aim is to produce representations of all of the different kinds of planes belonging to our own forces, and those used by the English, Canadian, Australian, Dutch, Russian, French, German, Italian, Japanese, and other nations now engaged in the war. All of the plans reduce the model to one seventy-second of full size. This scale has been chosen because the model, when sighted through standard aerial gun mounts, will appear like the real planes would at a distance of a half mile.

This model plane assignment may be but the forerunner of other similar jobs to be tackled later on. The Junior Red Cross is already engaged in preparing splints, stretchers, and the like.

One instructor proposes to make models of various types of incendiary bombs. Other suggestions may be proposed from time to time. The school-shop teacher should be wide awake to study and scrutinize each proposal as it is made, because some of them may be very much worth while and most of them will grip the student's interest because of present conditions.

A word of caution may be in order. The model planes which the students are invited to make at the present time, are required for a definite purpose. Before they are going to be accepted they will have to pass a more or less strict inspection by the navy department. If too many of these models will have to be rejected, industrial-arts work may merit nation-wide criticism. This, above all, should be forestalled by giving the work of the students a severe inspection before it leaves the school.

The model planes, simple as their production may seem, may have quite an influence on the future of industrial arts in our schools.

## Boys' and Girls' Week

April 25 to May 2 has been set aside this year as the national boys' and girls' week. While this movement is observed in many communities, there are still a very large number that have never attempted to use this means of focusing attention upon their boys and girls, the problems which beset them, the activities in which they are engaged, and the education and training which they ought to receive.

Much of the misunderstanding that exists between the public and the school is due to a lack of knowledge of what modern education offers to the child. Boys' and girls' week may well be fostered by the school for the dual purpose of making the children more conscious of what education means in their life and what the school endeavors to accomplish in the community.

This is doubly necessary during these trying times when so much emphasis must be placed upon getting our country ready for carrying on the war and bringing it to a victorious close.

Every teacher of industrial arts and vocational education ought, therefore, to exert himself to further the observ-

ance of National Boys' and Girls' Week in his community, and in this way bring the home, the church, and the school closer together in their common endeavor to bring up youth in the right way.

The National Boys' and Girls' Week Committee, 35 East Wacker Drive, Chicago, Ill., will gladly send a manual of suggestions to those who are interested. Other organizations that may be asked to cooperate with the schools in this venture are: the American Legion, Boy Scouts, Civitan International, 4-H Clubs, Girl Scouts, Kiwanis International, Knights of Columbus, Lions International, National Catholic Welfare Conference, Optimist International, Rotary International, and the Y.M.C.A.

## A Worth-While Effort

The intensive accident prevention campaign which Harold G. Campbell, superintendent of schools of New York City, has inaugurated in all of the school shops of this city, is worthy of serious study and consideration.

Reports show that only four or five accidents are reported weekly at the beginning of the shop term when the teachers emphasize safety. The number of accidents then begins to rise, and by the end of the thirtieth school day, from seven to nine accidents are reported per week. A renewed emphasis on shop safety at that time again cuts down the accident toll.

Teachers are, therefore, urged to make the teaching of safety a dynamic and continuous process, and to report every accident no matter how trivial to the superintendent's office so that close scrutiny on the accident rate may be kept.

## The Spirit of Michigan

It is probably foolhardy to single out the teachers of one state and sing their praises, because there are 47 other states in which there are teachers who are just as zealous, just as earnest, just as professionally minded, as those found in the state singled out for special mention.

While all of this may be true, yet the Michigan Industrial Education Society, as a state organization, has done so much for its members and for the profession at large, that the writer may be excused if he takes the opportunity of the seventeenth annual convention which this organization will hold at Detroit, Mich., on April 9 to 11, to write a few words about this fine group of industrial arts and vocational education teachers.

The First Line of Civilian Defense

When any great piece of work is accomplished, one may well look for the leaders who were responsible for it. Scanning a list of the past presidents of the Michigan Industrial Education Society shows that its leadership was of the best. Carl E. Karlstrom, supervisor of vocational education of Detroit, is at present at the helm, guiding the destinies of the society in his usual quiet, kindly, unobtrusive, but unfalteringly direct and efficient manner. Besides this, Earl L. Bedell, director of vocational education at Detroit, is the local convention chairman of the coming convention, and an excellent program can, therefore, be predicted. Speaking about the probable attendance, Karlstrom, with a twinkle in his eyes said: "We don't know whether we'll have tires next year, but for this year's convention you may be sure the Michigan teachers of industrial arts and vocational education will come rolling into Detroit in large numbers."

This very statement probably contains the germ which has made the Michigan Industrial Education Society great. In this organization the industrial-arts teachers and the teachers of vocational education really fraternize. They know each other's problems and they work together without envy and distrust. They know the boundaries which delimit industrial arts on the one hand, and the specific directness of vocational education on the other.

The members know each other personally, work together in some of the fine studies which the research committee of their society undertakes, and their combined efforts make the Michigan Industrial Education Society a splendid organization which deserves the greatest commendation, and which other state groups of shop teachers might well study and copy.

# The Milwaukee Experiment

JOHN J. METZ

Out of the desperate needs of the emergency production program, now confronting our country, came an inspiration which prompted some clear-sighted schoolmen and industrialists in Milwaukee to inaugurate a procedure which may have far-reaching results in the training of America's future craftsmen in the school shops.

It was shortly after January 1, 1942, that Fred W. Ziegenhagen, vice-principal of the Boys' Trade and Technical High School, Milwaukee, suggested to Thomas G. Brown, his principal, and to Roy Radtke, supervisor of industrial arts of Milwaukee, the thought that a program might probably be worked out whereby an industrial firm or several such firms might furnish materials to the school for the manufacture of certain parts to be used in producing war equipment, munitions, or the power machinery required to make these necessities to bring World War II to a victorious conclusion. This would aid the school to carry on its work of preparing skilled men for the machinists' and toolmakers' trades, and also give the students an opportunity to participate in the defense program. Both of the men assured Mr. Ziegenhagen that the idea was excellent and that efforts should be made to test out the possibilities of this plan.

Both Mr. Ziegenhagen and Mr. Radtke then contacted officials of the firm of Kearney and Trecker, who are manufacturers of the famous line of Milwaukee milling machines.

The firm became interested. A number of conferences were held, the brunt of the preparatory work for the school being done by Principal Thomas G. Brown; Vice-Principal Fred W. Ziegenhagen; Roy Radtke, supervisor of industrial arts of Milwaukee; Dr. W. W. Theisen, assistant superintendent of schools; John Westphal, president of the school board; and Omar T. McMahon, an assistant city attorney of Milwaukee.

The following abstract taken from Mr. McMahon's opinion relative to the legality of the proposed plan, may be helpful to others who want to try out this method of cooperation between school and industry.

1. If the school board accepts compensation for such work done by its students, it would really be engaging in private business for profit. The board of education does not possess that power.

2. If the board accepts compensation it may become liable for all damages to persons or property.

3. If the board accepts compensation, the students become employees either of the owners of the material or of the board; hence, provisions would have to be made for workmen's compensation insurance, unemployment compensation, and the federal wage and hour act would also have to be taken into consideration.

4. If students assume the status of employees, labor permits will have to be obtained as required by law. Under the Wisconsin statutes, employed boys between 16 and 18 must get permits to work in factories, but they can do such work only outside of school hours.

5. If the board accepts compensation, and the amount involved is $500 or more, competitive bids would have to be called for as provided by the Wisconsin statutes. Under a special ruling of the board of education of the city of Milwaukee, this would have to be done if the amount was $350 or more.

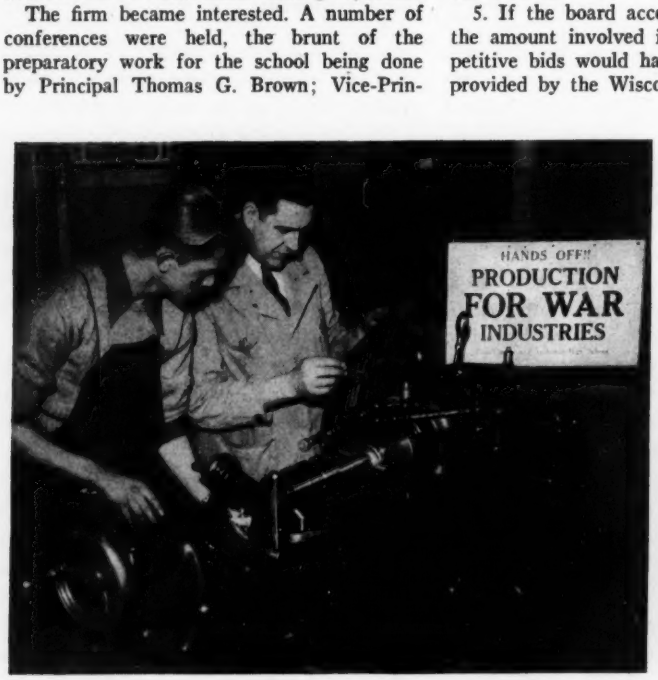
6. If the board does *not* accept compensation, then this production work becomes wholly an educational function, and the only liability assumed would be that arising under the safe-place statutes of Wisconsin, which require that school buildings be reasonably safe in their construction and maintenance.

Mr. McMahon, therefore, advised the board not to take any compensation for this work, not to make any contract, but to limit themselves to enter into an arrangement whereby a cooperating firm would deliver materials upon which the students might work. Such materials are to be delivered only during regular school-shop hours, and under written regulations approved by the superintendent of schools of the city of Milwaukee, and the principal of the school to which the materials are to be delivered.

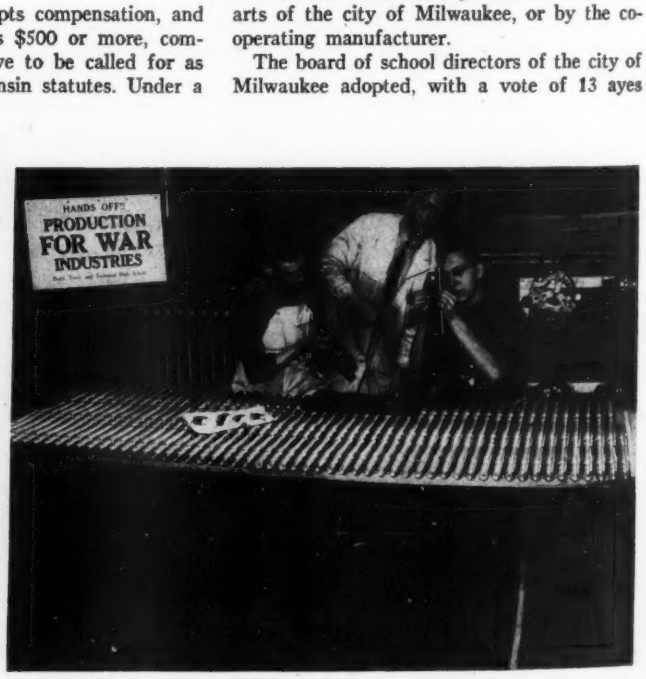
It should also be understood that only instructors are to have charge of the students doing this work, that the instructional phases of the work be stressed at all times, and that none of the work be permitted after close of the school day at 4 p.m.

It is to be understood also that the principal is to return all material, finished or unfinished, if and when called upon by the cooperating firm to do so, and that the work be terminated at any time by the principal of the school and the supervisor of industrial arts of the city of Milwaukee, or by the cooperating manufacturer.

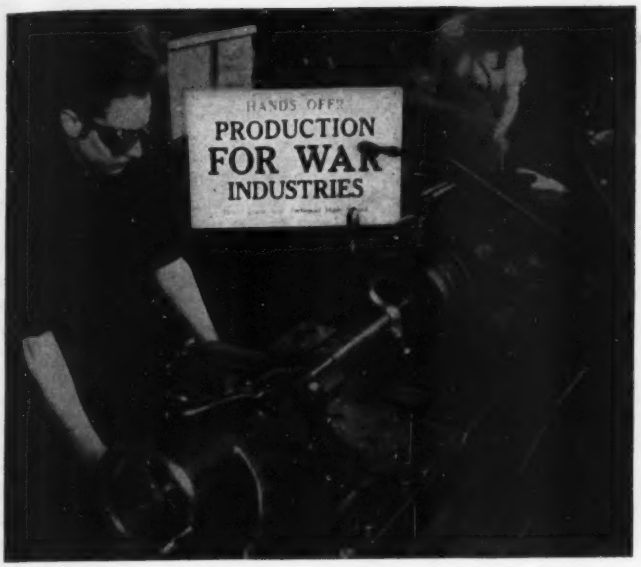
The board of school directors of the city of Milwaukee adopted, with a vote of 13 ayes




Shoulder cutting. Edgar Held is the instructor shown in the illustration




General inspection under the supervision of Frederick H. Shoenig, chairman of the machine-shop department




Turning to rough diameters

Grinding and inspecting the finished shafts

and 0 noes, the following recommendation of the committee on instruction:

". . . that the principal of the Boys' Trade and Technical High School be permitted to accept from private parties from time to time raw materials for use by the advanced students in technical courses in preparing them to become craftsmen, the finished products to be delivered to the parties furnishing the raw materials, all under such arrangements or directions as the superintendency may approve."

Pursuant to this vote, the work was then started, and by February 13, Vice-Principal Fred Ziegenhagen could report to Roy A. Radtke, supervisor of industrial arts, that material for 325 shafts had been sent to the school; that they had been cut to length, centered, end faced, and rough turned to the dimensions called for, and that they were now ready to be returned to the Kearney-Trecker Co. for heat-treating. After the heat-treatment, these shafts will be returned to the school for finish grinding, the tolerances for some of the diameters being as small as ½ thousandth of an inch, that is +.0005, and —0000 in. The deliveries received so far call for a total of 660 shafts. The additional stock for the balance will be received shortly.

Since the foregoing report was made, representatives of the firm have checked the finished shafts and have declared them quite acceptable.

Besides the shafts already mentioned, other projects such as gear segments, and the like, will be part of the work to be undertaken later.

The advocates of this plan have had to answer numerous questions. A few of these are added, because they may answer the queries arising in the reader's mind.

1. What about the wear and tear on the school's equipment? Is the firm going to reimburse the school for this?

The wear and tear under this plan will be no greater than it has been heretofore. The only difference is that the firm furnishes the material upon which the students work instead of having it furnished by the school or by the student.

The wear and tear will, therefore, be looked upon as a legitimate instructional expense borne by the school board.

2. How about the light and power? Who will pay for this?

These items, too, will be no greater than heretofore, and will be treated as in the past, like any other legitimate instructional expense.

3. What does labor say to this new venture?

The labor leaders approached on this subject feel that under present conditions where every skilled worker is already employed, this new venture in giving finishing skills to advanced students in machine-shop practice is entirely unobjectionable.

4. What does industry say?

Practically all of the subcontractors capable of handling this type of work in the Milwaukee area are working up to their capacity on defense work.

The school has the equipment and the necessary space for doing the required work and even the comparatively small quantity of work which 80 to 100 boys can produce is highly important in Uncle Sam's all-out effort. To date, therefore, industry has not raised any objection to the plan. The question as to what firm or firms can furnish work of this type to the schools has not come up either. The school board seems willing to cooperate with any manufacturer who seeks to deliver its materials so long as existing accommodations permit.

This is a new venture. It must be tried out, and undoubtedly many problems will arise. Solutions for these must be found as time goes on in the traditional American trial-and-error method.

5. Will this plan interfere with the contract arrangements between the Federal Government and the manufacturer?

Since the students are obviously not employees of the manufacturer there can be no conflict between the manufacturer and the government.

## THINGS TO THINK ABOUT

**By the late R. W. Selvidge**

Experiences are the things which happen to us as the future changes to the past.

To minimize the preparation for meeting the *probable* experiences of the future or to fail to consider the experiences of the past as they may affect the choice of these experiences of the future and our methods of meeting them, is to abandon the very purposes of education.

Those educators who do not look to the past for guidance as to the future, or who do not try to pry into the future to see what is likely to be demanded of us, and prepare for it, are confining themselves to very small territory.

Education means the evaluation of the experiences of the past with a view of developing the ability to predict, to modify, and to choose more wisely the experiences of the future.

It is very well to remember that "the child of today is the ruler of tomorrow," but we must not forget that the child of yesterday is the ruler of today.

Don't be content at doing your duty. Do more than your duty. It is the horse that finishes a neck ahead that wins the race. — *Andrew Carnegie.*

Let us have faith that right makes might, and in that faith let us to the end dare to do our duty as we understand it.

— *Abraham Lincoln.*

# Levels of Living

DEAN M. SCHWEICKHARD*

### Levels v. Standards

Under the press of patriotic necessity the American people are submitting readily to deprivations which no ordinary circumstances could have persuaded them to accept. Automobile tires had become as much a part of most families' equipment as clothing and shoes; sugar had come to occupy a large and essential part of the diet; and numerous mechanical and electrical gadgets had crept into the category of necessities in our way of living.

Suddenly these things and many others are to be rationed or are difficult to obtain, and the change in their availability makes it necessary for us to modify what we have come to look upon as our standard of living. The readiness with which these sudden changes are accepted seems to bear excellent evidence to the fact that as a people we are willing to forego the production and possession of things which bring a greater degree of ease and comfort, in order that we may preserve the fundamental values by which people live.

Some of the variations which have existed in the appreciation of comparative values may be illustrated by four men who lived in a typical American community. One of these men came from a European country where he had been ranked as count and had come to believe that work was beneath one of his station. As a result, he and his family lived in a hovel and dressed in rags while he attempted to maintain a falsely founded level of life.

At the other end of the economic scale was a man who had come into possession of a finance business through inheritance, much the same as the count had secured his title, and he knew about as little of its value and usability. The business ran for a number of years on its own momentum, and because of the ability of the other members of the firm whose services carried over from former days. This man gave his family all the luxuries of life, but neglected to cultivate in them and in himself the reserve ability to get along without those things if emergency or necessity demanded. In time his business and his family failed.

The third man, like the first, was a man of meager means and humble home; however, he was a craftsman faithful to his trade who supported his family in comfort, but not in luxury, and helped his children to become educated in the fields of their interests and abilities. One became an engineer, one a doctor, one a minister, and one a teacher; everyone a respected citizen ready to live and help live under varying conditions of material prosperity.

The fourth man struggled through his young manhood in the development of one of the northwest's great railroad systems, and in middle life found himself in possession of both wealth and influence. He wisely used his resources for the development of industry and agriculture throughout the territory his railroad served, and had each of his sons become thoroughly conversant with the intricacies of one of the contributory activities.

Observations such as these serve as reminders that the level at which an individual or a family lives is too frequently measured by false or inappropriate standards. Often it is the size, color, location, or furnishings of the house; sometimes the make, the trimmings or the accessories of the automobile; or perhaps the clothes he wears, the job he holds, the church he attends, the club he belongs to, or the school where he is enrolled. These things enter into one's mode of life, but whether the effect is adverse or beneficial does not depend upon the physical attributes of the things themselves. The only true measure of the level at which the individual lives is the *use* he makes of these things.

### Maintaining Constancy

Intelligent use of material resources and opportunities, and hence the level at which one lives in relation to them depends very largely upon his quality of thinking, since beneficial results can come only through the accurate interpretation of environment. This includes the evaluation of oneself, and points to the necessity of clear thinking. Too high an estimate of self brings about a condition of conceit and is detrimental to the best way of life or service. It is just as dangerous to think too little of oneself, however, for too low a conception is akin to discouragement and leads to the acceptance of low standards in such fields as: accuracy in work or play; personal appearance; morals; and scholastic attainment.

A constant level in the task of living, like gasoline in a fuel chamber or water in a city water tank, is maintained by an adequate source of supply, accompanied with appropriate controls which are preferably automatic. There are certain forces or institutions in our way of life that help to maintain a desirable level of living through varying times and circumstances. One of the most fundamental of these is the home controlled by an atmosphere of thoughtfulness and mutual consideration. Another indispensable institution is the school managed by a board wholly devoted to the public good; administered in wisdom, firmness, and sincerity; and manned by capable teachers with a true sense of faithfulness, courage, and patriotism. There are others which might be included, but the home and the school are the foundation of all the rest.

The depression years have demonstrated the mistake of a merchant in stocking his shelves with only enough goods for today's trade. So it is in many other areas; to live on the level of the present is not enough; to be victorious in today's conflict is not enough to guarantee a total and lasting victory. In the construction of a great ship the work of today must fit in with the work of tomorrow and all the days to come until the cumulative results of all the days' work of all the workmen shall be a masterpiece of human thought and skill ready to serve, in transportation or in combat, in preserving the noble plane of life upon which men may live.

The most delicate and up-to-date radio has a line indicator which shows with a very high degree of accuracy when the instrument is tuned most perfectly to the station it is attempting to receive. A variation in any of the settings sets the indicator off, and interferes with the reception. The military officer who keeps accurately tuned to all the requirements of his office is best prepared for quick and effective action. Indifference, dissipation, jealousy, or false pride cause serious interference with clear-cut performance just as a poor adjustment interferes with the best reception of the radio.

### To Higher Levels

The strenuous struggle and strife going on throughout the world may seem incompatible with the spirit of the season as Easter approaches. As a matter of fact, however, times of darkness, discouragement, and sadness are often necessary to the full realization of the meaning of joy, success, and happiness. The bulb of the Easter lily lies dormant, but when prompted by warmth and light springs forth into a higher and more beautiful form of life. Similarly the egg, although seemingly lifeless, is the necessary forerunner of every form of gay bird life from the delicate hummingbird to the glorious peacock. This does not mean that a beautiful life can or must always spring from a dismal source, but it *does mean* that with the *right influence* what there is of good or joy or permanent value in dark or dismal things may ultimately come forth.

The government of the United States was created upon the principle that the best interests of the individual and the most fundamental values of the community are mutually interdependent. The original 13 colonies were banded together for the preservation of that principle as a congregation of communities. The outcome of the Civil War denied the right of any state to force its own rights above the welfare of the whole nation. Now we are engaged in a world-wide struggle to deny the right of any aggressor nation to sieze and dominate any other nation by force; and to establish a world community of nations where there shall be preserved to all peoples the right to work for and move toward an ever improved level of living.

*Assistant Superintendent of Schools, Minneapolis, Minn.

# Problems and Projects

## UNIVERSAL MILLING MACHINE VISE

WILLIAM A. DE VETTE
Technical High School
Erie, Pa.

(See assembly and details on pages 168 and 169)

The original drawings for this vise were developed for the toolmaking classes operating under the National Defense Industries Training program. As a unit it makes a good project for advanced drafting classes.

The variety of shapes, while not difficult to draw, involve many principles in drawing and dimensioning. The related information that may be covered in connection with the vise is also very valuable.

When the drawings have been completed they may be passed on to the pattern shop where the five castings required offer a variety of pattern construction.

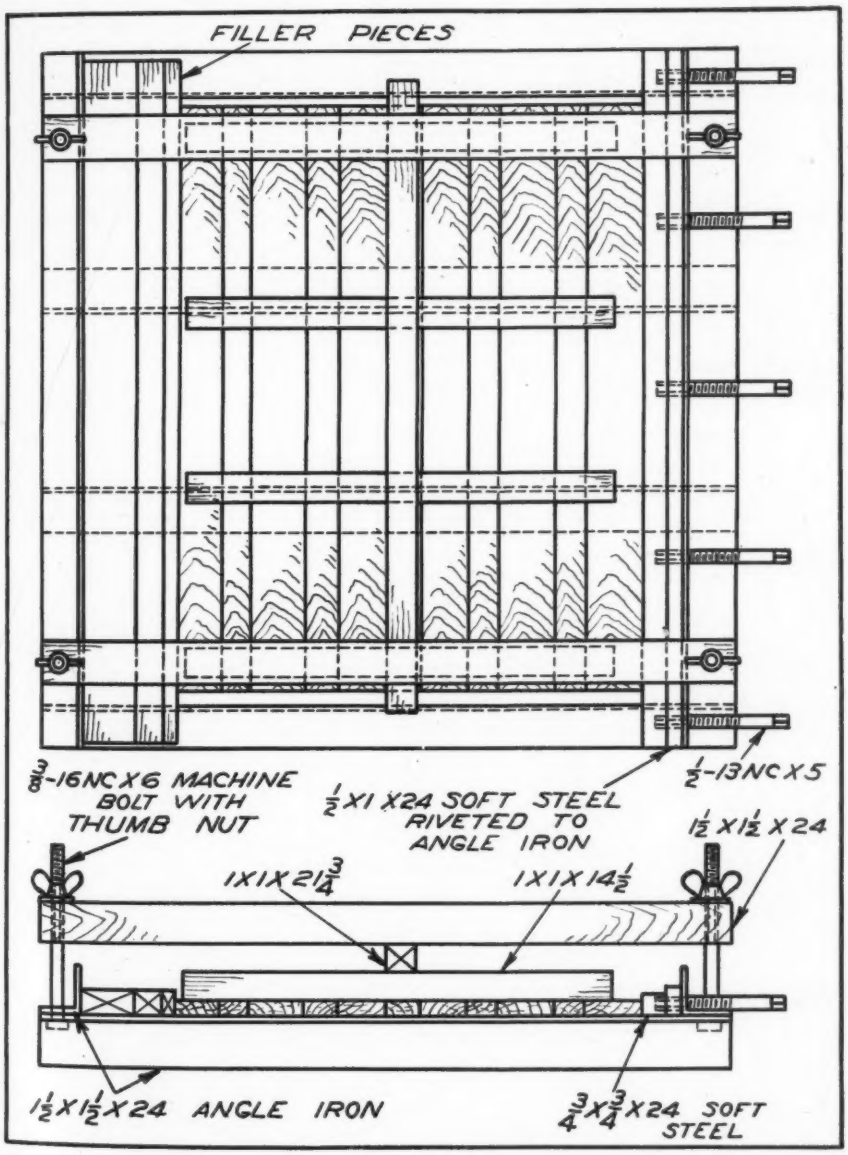
In the machine shop the vise is useful both in the instructional value involved in its construction, and later as added equipment for the milling machine.

## HANDY CLAMP

WILLIAM E. CASWELL
State Teachers College
Manfield, Pa.

This clamp is a very convenient accessory in a general shop. It is used when gluing up small stock for serving trays, checkerboards, cutting boards, and small table tops. The vertical pressure bars prevent thin material from buckling.

The size of the clamp may be varied. The one shown is made of 6 pieces of 1½ by 1½ by 24-in. angle iron. Filler pieces of various widths are used to reduce the capacity of the clamp for narrow work.


FILLER PIECES
3/8-16NC X 6 MACHINE BOLT WITH THUMB NUT
1/2 X 1 X 24 SOFT STEEL RIVETED TO ANGLE IRON
1/2-13NC X 5
1 1/2 X 1 1/2 X 24
1 X 1 X 21 3/4
1 X 1 X 14 1/2
1 1/2 X 1 1/2 X 24 ANGLE IRON
3/4 X 3/4 X 24 SOFT STEEL

A handy clamp

## BLOCK TYPE LETTERS

F. N. NEWTON, JR.
Senior High School
Sharon and Sharpsville, Pa.

The block type letters illustrated will be found very useful to instructors who are called in to make signs for various school activities. They are easily made and can be handled by most students who have had training in mechanical drawing.

The size that the little squares are made will determine the size of the aphabet, therefore any size letters may be made by taking various proportions of the squares illustrated.

A sign made up of this type of letter will be found very readable as well as very easily made.

### Stencil Alphabet

Many mechanical drawing departments in high schools are called on to make a good many signs, posters, and the like, for teachers in the system, for various entertainments during the year, and for many athletic events. In order to lessen the burden to some extent, the writer has for a long time been trying to devise an alphabet that would accomplish this more readily and one which could be easily handled by the students.

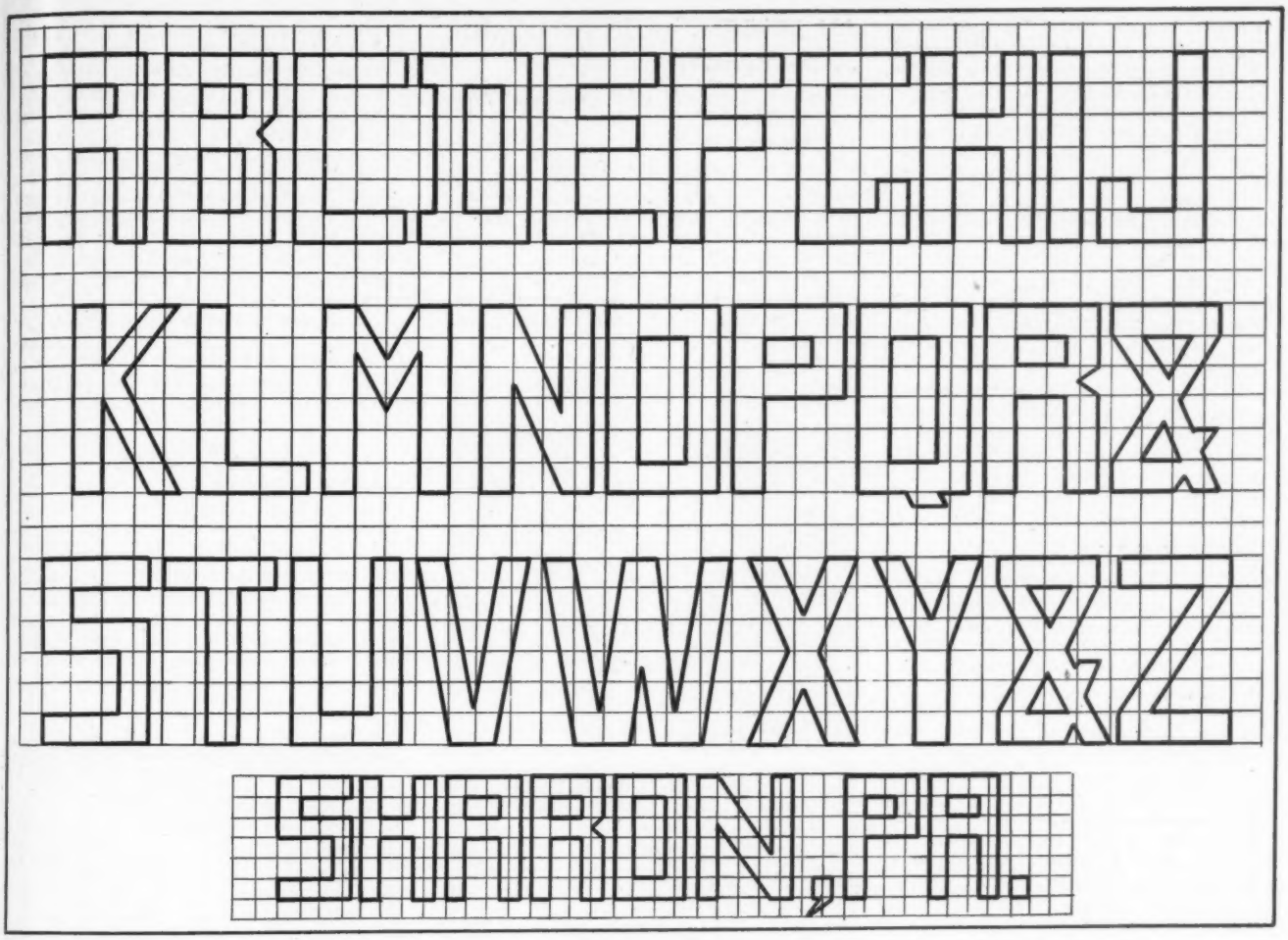
The alphabet and figures illustrated will accomplish all that any instructor may expect and after a little experience can be handled very rapidly. All that is needed to make the alphabet and figures is the three templets illustrated.

In the illustration the letters and figures templets are made four times actual size in order that the divisions may be more easily read. In other words, the templets illustrated are 2 in. high. For illustrating purposes they are suitable for letters and figures 8 in. high. For 6-in. high letters and figures it is only necessary to use the sizes on the templets ¾ size. For 4-in. high letters and figures the sizes would all be half the size of the divisions on the ruler, and half the size of the other two templets. For the 2-in. letters and figures the sizes would be ¼ the size of the templets. An explanation of the use of the ruler for the straight strokes follows:

The *X* size is illustrated on the letters *A, E, F, K, M, W* and on the figure 4. The width of all stems of the letters and figures is the distance from the left end of the ruler to the line illustrated at figure 1 and letter I. The normal center of all letters and figures not noted otherwise is the distance from left end of rule to line marked *normal center*. As an illustration take the letter *B*. The center of the letter would be from the outside at the left to the center and then all that is necessary to complete the letter is to place two circular templets so that the outside of the arcs come the normal-center distance from the center of the letter to the right-hand side. In like manner the center of the *M* and figure 4 and

(Continued on page 165)

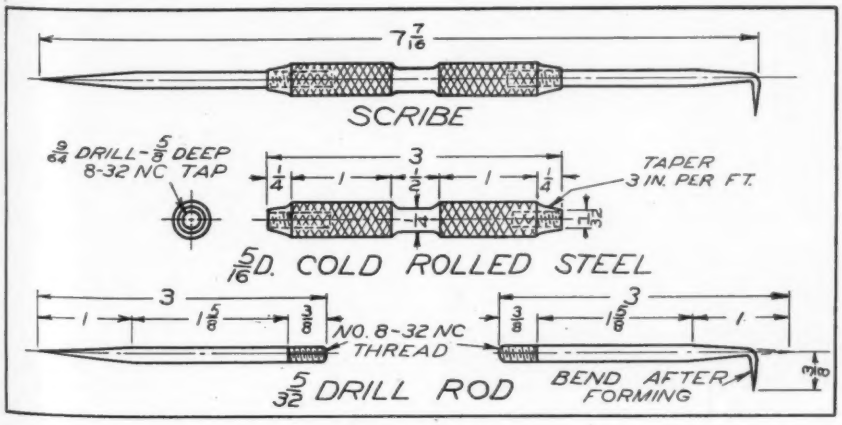
ABCDEFGHIJKLMN
OPQRSTUVWXYZ
1234567890 ;:
RULER FOR STRAIGHT STROKES
Stencil guide




Block type letters

the center of the letter *W* are made. The width of the letter *L* is the distance from the left end of the rule to the line marked *L*. The width of the *E*, *F*, *J*, and *?* are handled the same way. The normal width of all other letters and figures is the distance from the left end of the rule to the line marked *normal width*. The width of the letter *M* and figure 4 and the width of the letter *W* are handled in the same manner. The height of all letters and figures is the distance from the left end of rule to the line marked height. In making different sizes of letters and figures all that is necessary is to take the proportions of these divisions. The templets for the circular letters and figures are divided into equal parts so that they may be more easily lined up when forming the letters and figures.

The writer has a set of templets for letters 2, 4, 6, and 8 in. high. They are made from approximately 1/16-in. thick celluloid which may be purchased at most auto accessory stores. The divisions of the rule and the lettering on it may be scratched on with a divider point and then wiped with a rag having India ink on it. This fills the slight indentations with ink so that it is more easily read.



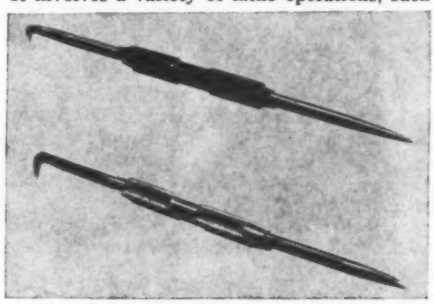

Scriber details

## SCRIBER

**REUBEN A. CHARETTE**
Instructor, Metalwork
Rufus King High School
Milwaukee, Wis.

The problem of keeping a set of 30 metal scribers in excellent condition has always been a perplexing task, not to mention the effort to account for all at the close of each class hour. For this reason all students taking metalwork for the first time are required to make scribers for their own personal use. This project was at first a crude affair. The accompanying description and illustrations show a scriber that is not only an excellent shop project, but it is a beautiful and useful tool in the metal shop when completed. Its cost is nominal.

The construction of the scriber is simple. It involves a variety of lathe operations, such



as straight turning, taper turning, facing, drilling, polishing, and knurling. At the bench, the student shapes the points with the file, cuts threads with the tap and die, bends a point, and finally hardens the two ends.

*Materials Required:* The required materials are one piece of 5/16-in. round cold-rolled steel 3 in. long, and one piece of 5/32-in. drill rod 6 in. long.

*Method of Procedure:* To machine the body, or center section, place the 5/16-in. round stock in a universal chuck and face one end. Then face the other end and machine to the length shown. Set the taper attachment for 3-in. taper per foot. Taper one end for a distance of ¼ in. from the end, machining the end to 7/32-in. diameter. Repeat the same procedure for the opposite end. To prevent chattering and vibration be careful not to allow the ends to project too far beyond the jaws of the chuck. Straight turn in the middle for a distance of ½ in. and to the diameter of ¼ in. Locate the center at the ends, center punch and then drill 9/64-in. holes ⅝ in. deep. Polish with No. 2/0 emery cloth.

Knurl one end, using a fine or medium knurl. When knurling the end opposite the chuck will have to be supported. Place a drill chuck in the tailstock and insert a piece of ⅛ by 2-in. drill rod in the drill chuck. Draw up the tailstock and insert the drill rod into the 9/64-in. hole; use white lead and oil for a lubricant on this piece of drill rod. Make sure that the knurling tool will have the required freedom between the lathe chuck and the drill chuck. Knurl the other end, following the same procedure. Before placing the knurled end in the lathe chuck, cover its surface with a piece of thin copper to protect the knurling from being damaged.

Tap both ends with the 8-32 machine-screw tap, for a distance of about ½ in.

The points of the scriber are tapered for a distance of 1 in. with a file. The 5/32-in. drill rod is held in the bench vise, between copper jaws, while the 1-in. tapered point is dressed. The drill rod is finally placed in the lathe chuck and the points finished accurately. Cut the 6-in. drill rod into two pieces. Cut threads at the blunt ends for a distance of ⅜ in. with the 8-32 machine-screw die. Grind a 60-deg. point at tapered ends, to form a shoulder of about 1/32 in. Bend one point by placing the point ⅜ in. beyond vise jaw, then draw over by applying blows with a lead hammer.

To harden the two points, heat them to a cherry red color and then quench them in water. Apply the heat cautiously so the extreme point is not overheated. The cherry red color should extend about 1 in. from the point. Assemble after all parts are finished. If parts do not line up with center axis, straighten in vise.

*Method of Finish:* The finish of the scriber can be done in one of two ways, depending upon the student's choice. The scriber can have an *all-bright* finish, or the body section that fits into the hand can be *oxidized*, leaving the points all bright. To oxidize, heat the stock separately and slowly over a small flame and when the colors between the yellow and blue appear, quench in oil at the desired oxide color. Either finish is attractive, but the advantage of the oxide finish is that it is not so likely to rust from the moisture of the hand and air. The points can always be polished if necessary.

## AN EFFICIENT GLUE APPLICATOR

JOHN J. SCHMITT

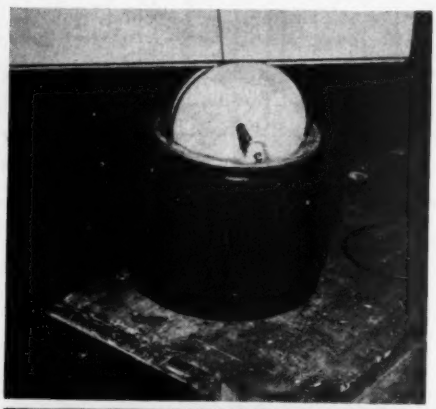
Edison Technical and Industrial High School
Rochester, N. Y.

As pattern instructor, I have felt for a long time the need and desirability of improving the method of applying glue to such projects as the tongue and grooved cleats used at each end of basswood drawing boards.

The method usually used is inefficient because glue is spattered over joints and edges when a brush or a wedge shaped stick is used to apply the glue, and to remove it, after it has been applied, would ruin the finish of the wood and the quality of the work.

The method described herewith has proved to be so satisfactory that we have used it for all our standard straight line projects in the pattern department. It consists of a wooden wheel, grooved to the proper width and depth and set on an axle fastened to the top of the gluepot. The tongue grooved boards are then rolled in the groove in the wheel. The groove in the wheel carries the glue to the joint when the wheel is revolved. The joint is then completed with clamps and a clean efficient product is the result.

A clear idea of this device is seen in the photographs accompanying the article. It can also be noted that this idea is applicable to any size or length board. The idea can be enlarged upon by having a system of wheels with various size grooves.



Handy glue applicator

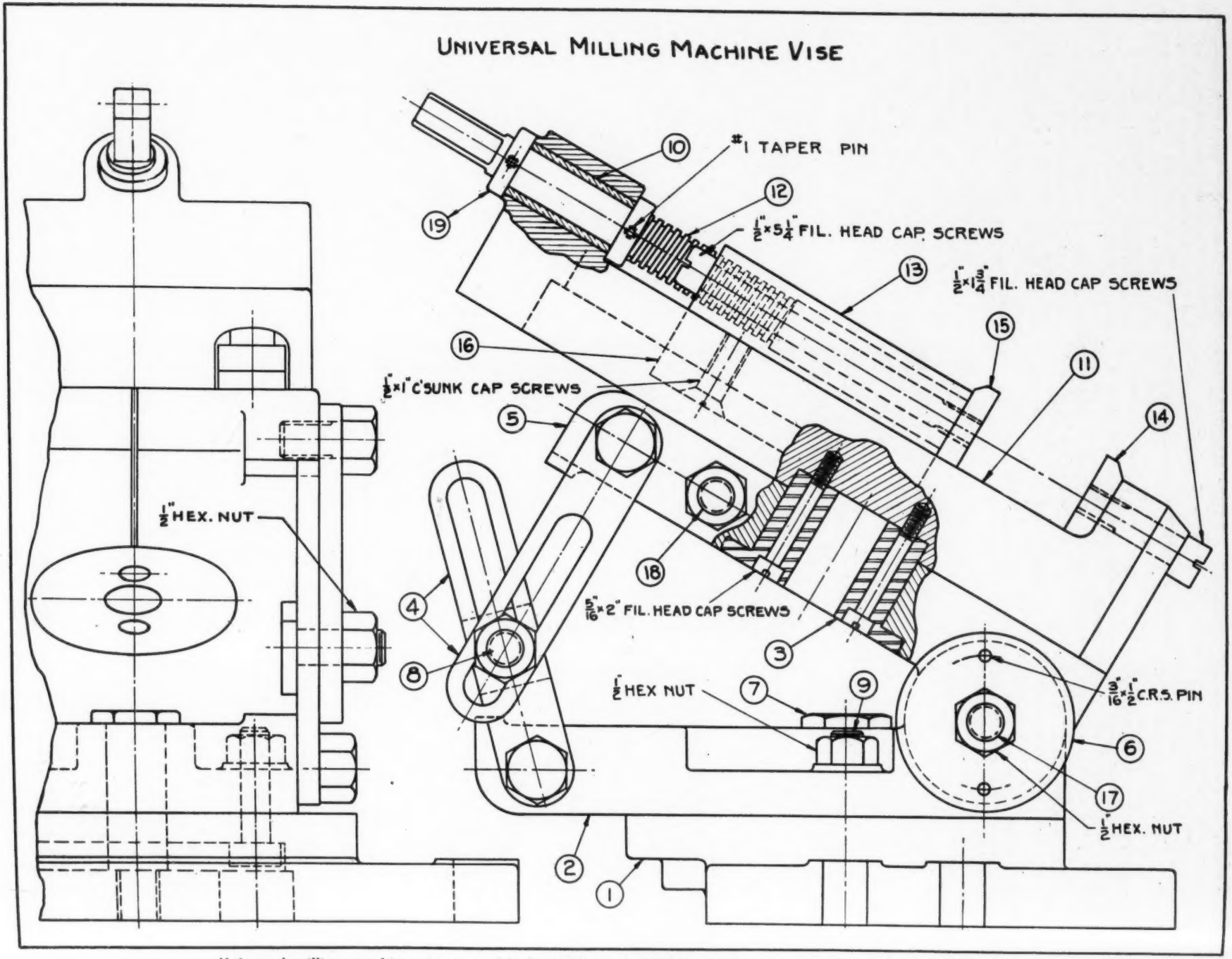
## SERVING TABLE

HARRY A. FRINGER
Central High School
Trenton, N. J.

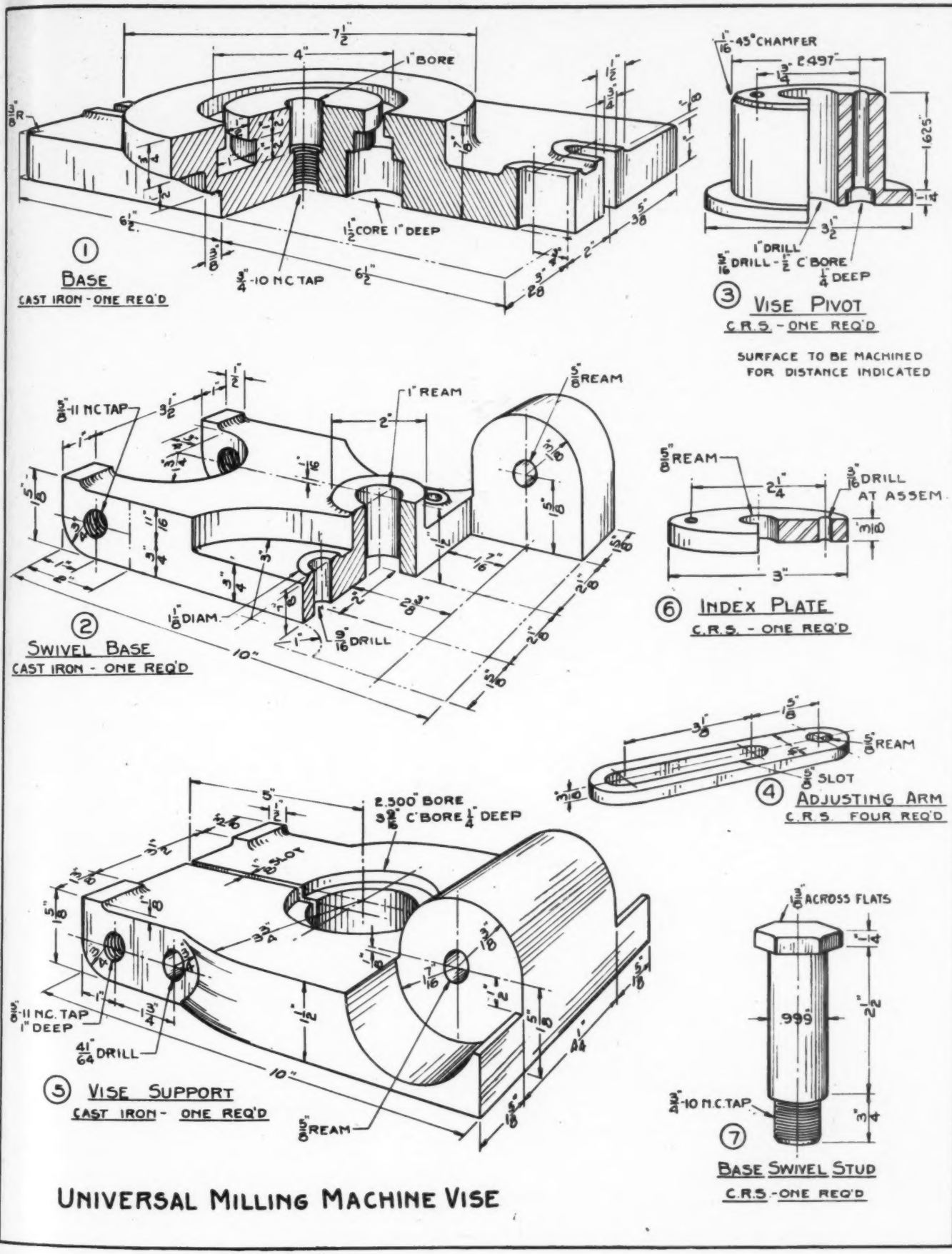
The serving table described herewith is a popular and suitable project for a tenth-grade student. It lends wonderful possibilities for doing inlay work. It has a rather unique feature in that all of the doors form shelves. Part *E* slides down in the groove shown in section *A–A* as the bottom of the door is

(Turn to page 171)

Serving table. Bottom picture shows how doors form shelves when opened




Universal milling machine vise assembly by William A. DeVette, Instructor, Technical High School, Erie, Pa.
(For description see page 163)




1 BASE
CAST IRON - ONE REQ'D

2 SWIVEL BASE
CAST IRON - ONE REQ'D

3 VISE PIVOT
C.R.S. - ONE REQ'D

4 ADJUSTING ARM
C.R.S. FOUR REQ'D

5 VISE SUPPORT
CAST IRON - ONE REQ'D

6 INDEX PLATE
C.R.S. - ONE REQ'D

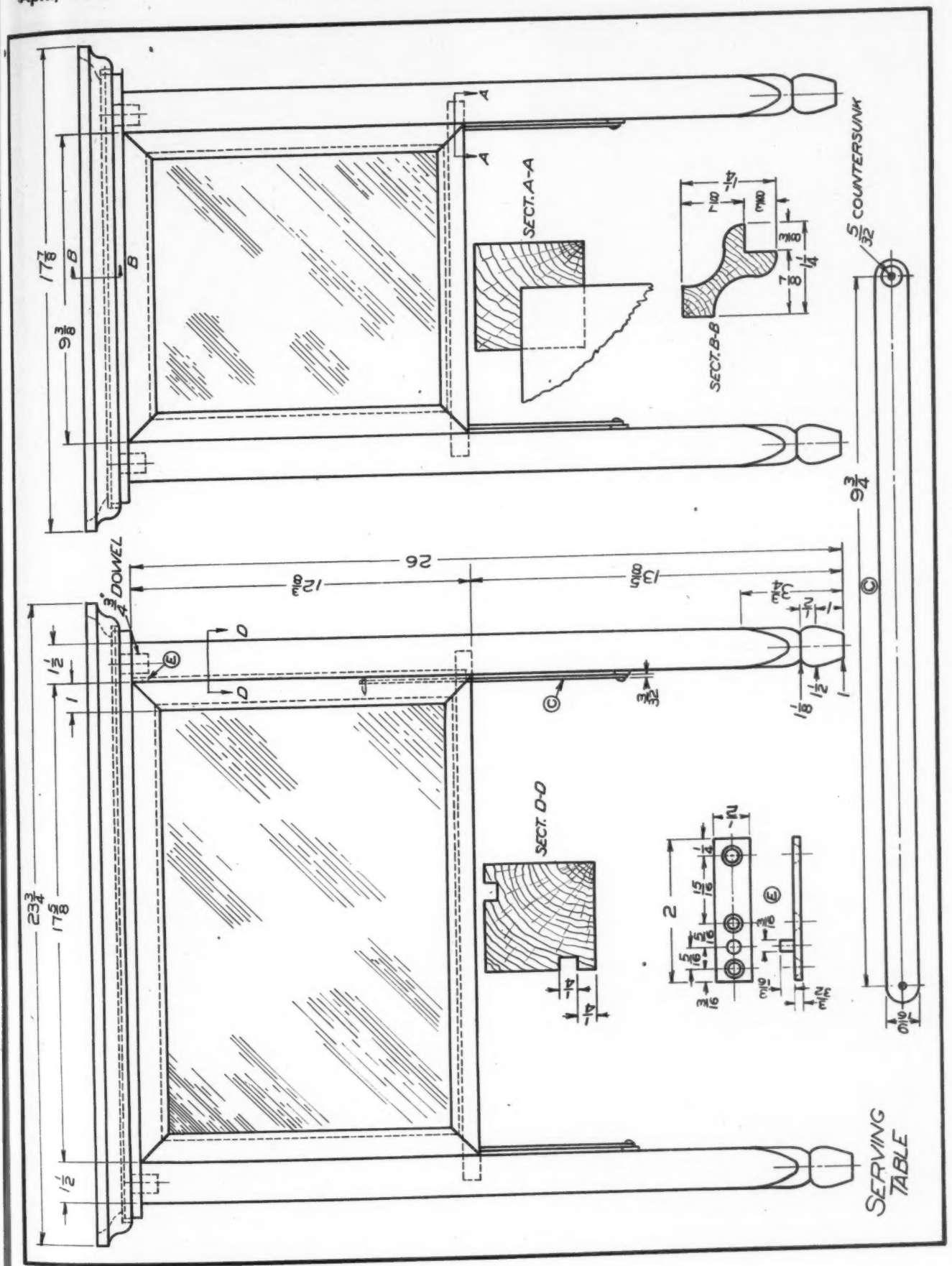
7 BASE SWIVEL STUD
C.R.S. - ONE REQ'D

# UNIVERSAL MILLING MACHINE VISE

Universal milling machine vise details by William A. DeVette, Instructor, Technical High School, Erie, Pa.
(For description see page 163. For additional details see next month's issue)

Universal milling machine vise assembly by William A. DeVette, Instructor, Technical High School, Erie, Pa. (For description see page 163)

77
23¾




Serving table designed by Harry A. Fringer
(Continued from page 166)

(Continued rom page 166)

pulled outward. When the door is horizontal, it is held there by the brace *C*, and part *E* has reached the bottom of the groove in which it slides.

The tray molding need not be like the one shown in section *B–B*. This contour was cut from 1¼-in. square stock and was put through a shaper. Then it was reversed and cut again with the same cutter blade.

Mahogany or walnut is a desirable wood to use for this project. A French polish or a good grade of rubbing varnish makes a suitable finish.

## TIN-CAN FLAG STAND

JOSEPH J. LUKOWITZ

Public Schools
Milwaukee, Wis.

The accompanying illustration shows the construction of a timely project which will interest all pupils. It may be used as a desk, table, or radio ornament.

Material salvaged from used tin cans is utilized in the construction of this flag stand. For the base use a can bottom. Cut off the bottom with a can opener which smoothly rolls the rim over. The bottom may also be cut off with tin snips. The can bottom may be used as is, as shown at *A*, in Figure 1, or it may be shaped as shown at *D*, by hammering with a ball-peen hammer while holding the can bottom over a slight depression hammered into the end grain of a block of wood.

The flag socket may be shaped around a 16d nail. First bend the tin around the nail into a U shape with the fingers. Then use a small mallet or tap lightly with a hammer to finish the shaping of the socket. A V cut, a groove, or a flute cut into a block of wood will aid in bending the tin to the U shape. Place the tin over the flute and force it into the groove by hammering down a nail laid lengthwise over the tin.

Little jigs and devices, such as this simple arrangement to bend the tin, are highly educational and they help to prepare the pupils to take their places in our industrial production line as designers, intelligent operators, and interested consumers. The jig for holding the flag socket in position for soldering is another phase in the construction of this project which is very valuable experience for the pupils. The jig is made of three pieces of tin soldered together. The soldered joints on the jig will not loosen when the jig is in use because it does not get hot enough to melt the solder. Be sure to solder the lower stretcher of the jig high enough so that the same jig can be used for both base designs. The instructor should call attention to the use of jigs and fixtures in industry and call attention to the fact that practically every manufactured article is produced with the aid of some sort of jig, fixture, or die.

As a precaution against burning the tin while soldering use very small pieces of solder. Wire solder can be cut into very small pieces by hammering it flat, then slitting it with tin snips and then cutting off very small pieces. Place a little soldering paste together with a few small snippets of solder into the lower end of the socket, and set both socket and base into the jig. Bring a candle flame or a small gas flame near the tin. When the solder melts it will run around the joint and form a little fillet inside and outside of the socket, thus producing a very strong joint.

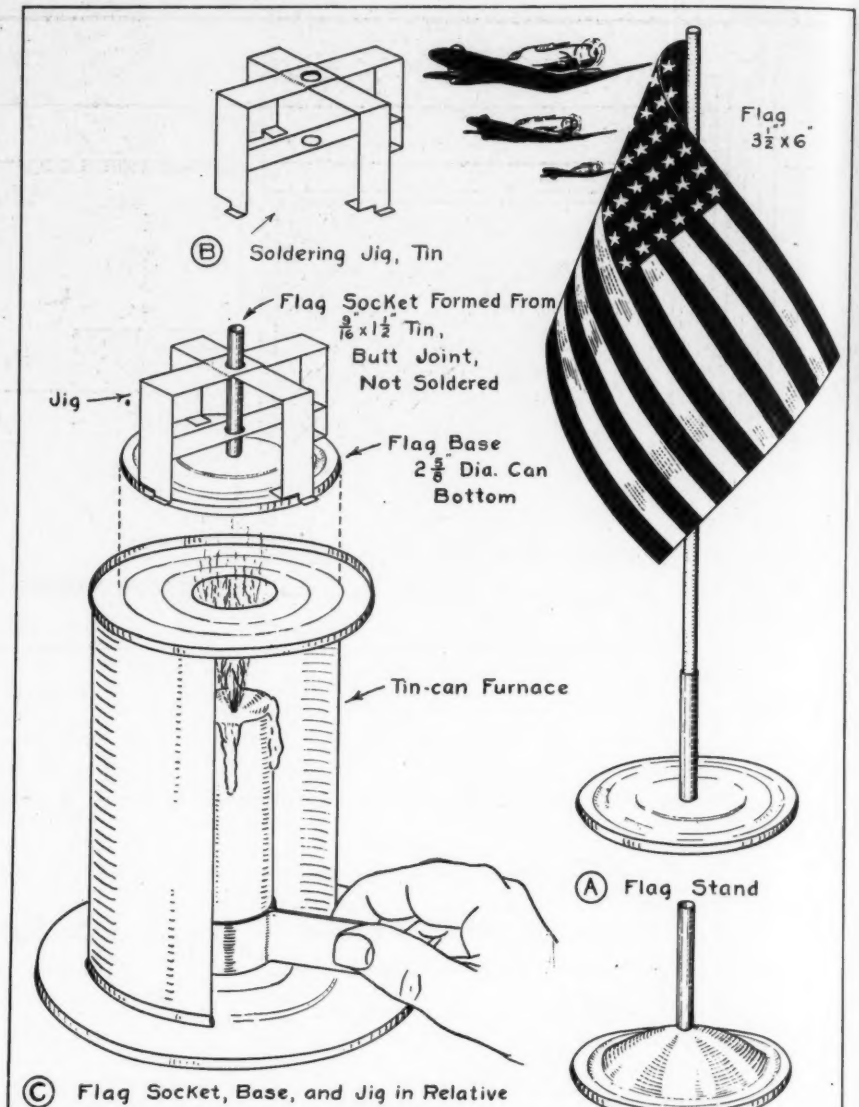



**Fig. 1. Tin-can flag stand**

Do not hold the flame in position for more than two or three seconds after the solder starts to run, otherwise the tin may be burned. The use of large pieces of solder will require so much heat that the tin will be burned in the soldering operation. The flag stand may be polished with any metal polish or with No. 3/0 steel wool.

## LOG MARKS AND LOGGING PRACTICES IN WESTERN MICHIGAN

LEWIS L. TORRENT

Hackley Manual Training School
Muskegon, Mich.

The information presented herewith will undoubtedly be of interest to many teachers of woodworking, describing as it does, some of the practices followed in the early logging days of this country.

The lumber marks shown in Figures 1 and 2 were taken from the early records of Muskegon County, Mich. Those shown are but a few of the marks used during the lumbering era. Figure 3 shows some of the marking hammers and punch bars that were used for marking the logs.

The first log marks were recorded in the state of Maine more than 100 years ago. The first records from Bangor, Me., date back to 1820. Thirty-nine years later, 1859, Thomas D. Stimpson, Muskegon, Mich., recorded the first log mark in western Michigan. This record appears in the Muskegon County clerk's office as follows:

"T & S made by hammer on each end of log. I K I with axe on the side of log. Thomas D. Stimpson log marks. Recorded December 21, 1859. E. W. Wylie, Clerk."

As early as 1837 lumber was manufactured in the Muskegon area. At that time it was not necessary in western Michigan to brand the logs, as the timber was cut at close range and the logs were hauled directly to the mills by oxen. As time passed on, however, the near-by standing timber became exhausted and the

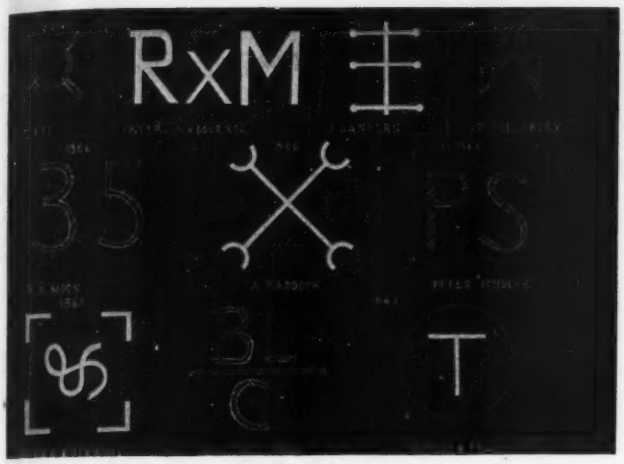



Fig. 1. Log marks

Fig. 2. Log marks

lumbermen found it necessary to operate many miles from the mills. It was then that the rivers became the highway for transporting the logs to market.

In 1842 the Michigan legislature passed a law requiring registration of marks with the clerk of the county wherein the mill was owned and operated. This act proved to be a great benefit and safeguard for the men operating on a large scale. The Muskegon River soon became the greatest log route in the world. Between 1838 and 1916 the enormous total of 25,000,000,000 ft. of timber, mostly pine, floated down this river to the sawmills. The peak was reached in 1887 when 665,449,921 ft. of lumber were cut.

At this time the lumbermen realized that the log mark was necessary to determine ownership. Hence, the log mark was to the lumber operator what the brand is to the cattlemen of the western plains.

So important were the log marks locally that a Muskegon merchant expressed his civic pride by using 10 selected log marks in expressing the cost price of his merchandise.

From 1865 to 1888 several hundred log marks were recorded in Muskegon County. All shapes, designs, and figures are to be found in the records. Many of the marks are merely initials; others consist of pictures, half moons, stars, cups, saws, letterpresses, pipes, and so on. Most of these markers were made in local machine shops and some show considerable skill in their construction. The double-bitted ax was the first tool used to mark logs with simple notches such as straight lines, crosses, etc. Then the marker with an emblem on one end and an ax blade on the opposite was used. Then came the double marker with an emblem on one end and a number on the opposite. The number was a check on the man who marked the log. For marking logs that were piled, the punch bar was used most satisfactorily. The bar was 5½ ft. long with the emblem on one end and the marker's number on the other. The logs were never marked in the woods. They were skidded near the rollway on the bank of the river and then marked. A considerable degree of accuracy was necessary to mark logs, hence, only the better lumbermen were picked for this job.

In the early sixties, booming companies were organized, whose duty it was to deliver the logs to their rightful owners. At the mouth of those streams, along the banks of which lumber mills were located, so-called sorting grounds were established. Rivermen were stationed at these points to sort the logs. Each sorter was provided with a list of marks for which he was responsible, and some of them became quite expert at the art of sorting. This system proved most satisfactory and very few logs escaped the keen eye of the riverman. After the logs for one mill were collected they were tied together with dog and chain, and towed to the owner's mill where the actual processing began.

Figure 4 shows the Torrent and Arms sawmill which was built at North Muskegon in 1877. At the time it was the largest in western Michigan. One of the stories taken from the records at this mill relates that a 16-ft. log, 59 in. in diameter, was delivered 4 years after having been put into the river. This log produced about 3000 ft. of lumber.

## MAKING USE OF OLD CHAIR RUNGS

HAZEL F. SHOWALTER

Davenport, Neb.

The fancy rungs and legs from worn-out and discarded chairs, along with similar legs and other odd pieces salvaged from other discarded furniture, may be used for making novelties of many kinds, the various shapes of the wood suggesting the novelties to be made. The more ornate the shapes, the more useful they will be.

This material can be collected at very small expense, possibly some of it at no expense at all. When cleaned of successive layers of old varnish or even paint, seemingly hopeless material may prove to be attractive wood in

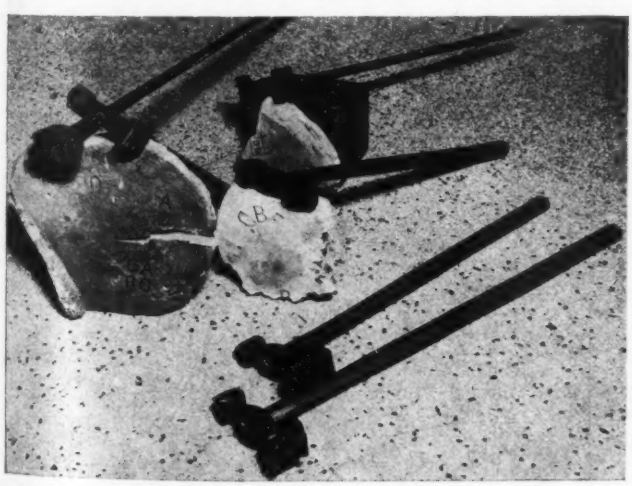


Fig. 3. Marking hammers and punch bars

Fig. 4. Largest sawmill in Western Michigan in 1877

Fig. 1. Bud vases and candle holders

Fig. 3. Chair parts used for novel purposes

good condition. Weathered and nicked material may have the cracks and holes filled and be coated neatly with enamel.

The novelty that comes most readily to mind is a hatrack. A suitable piece is cut from a chair leg for the post of the rack, allowance being made at each end for a tenon. The upper end of the post is then mortised to a 3-in. disk of wood, the lower end to a 6-in. disk, the upper edges of the disks having been neatly rounded. If the hatrack is to be finished with varnish, wood to approximately match that of the post should be chosen for the disks.

Some chair legs will yield portions that form pleasing vase shapes, like those shown in Figure 1. Such a shape must have a hole bored in it and then be mortised to a wooden base for stability. A vase intended for artificial flowers needs only a small, short hole, but one that is to hold water for a real flower, perhaps a rosebud, must have a wider, longer hole in which a test tube or other container may be placed.

The candleholder pictured was the lamp stand from an old organ. It is merely turned upside down and provided with a handle. Removing the tenon which attached it to the organ left a hole about right for a candleholder. A metal candleholder to fit in this

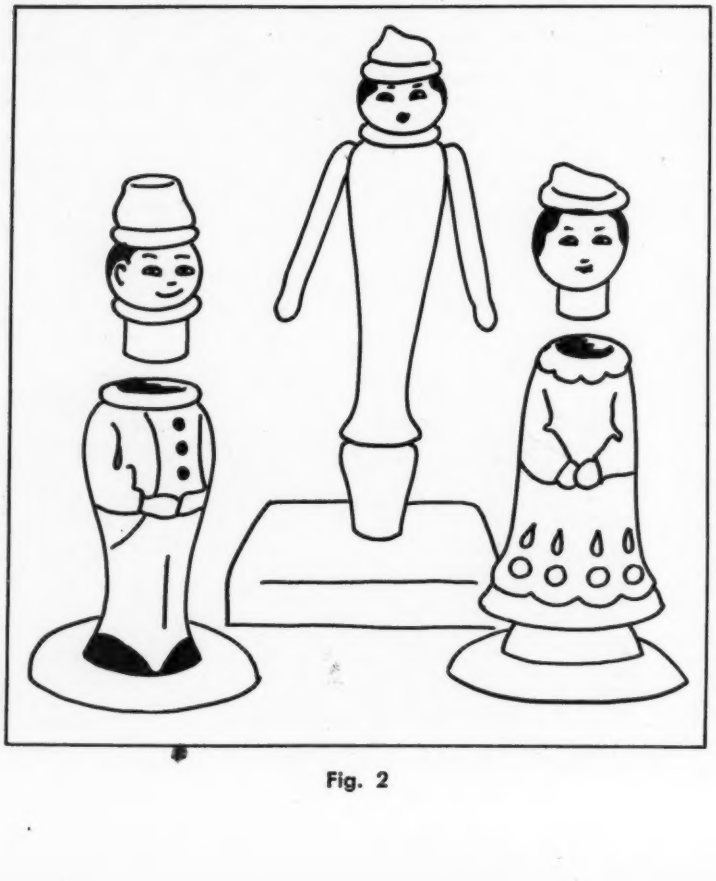


Fig. 2

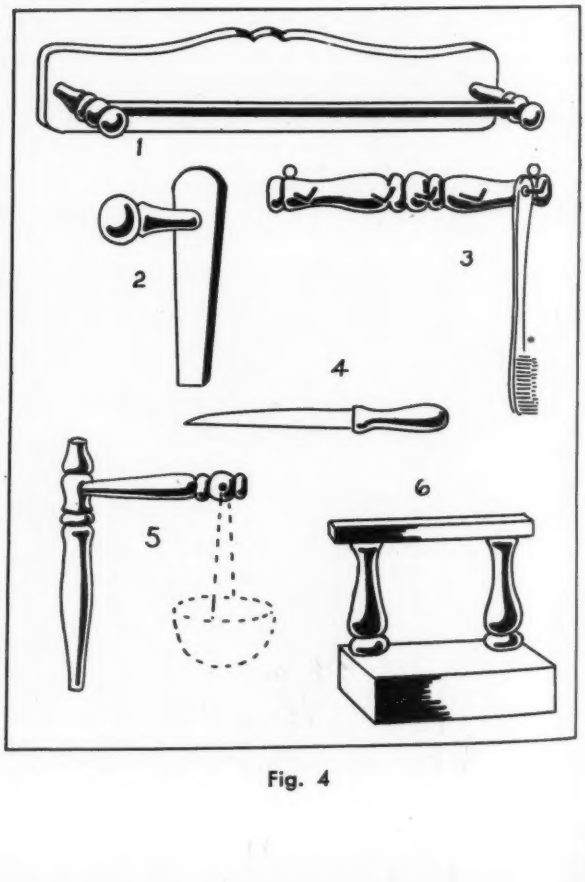



Fig. 4

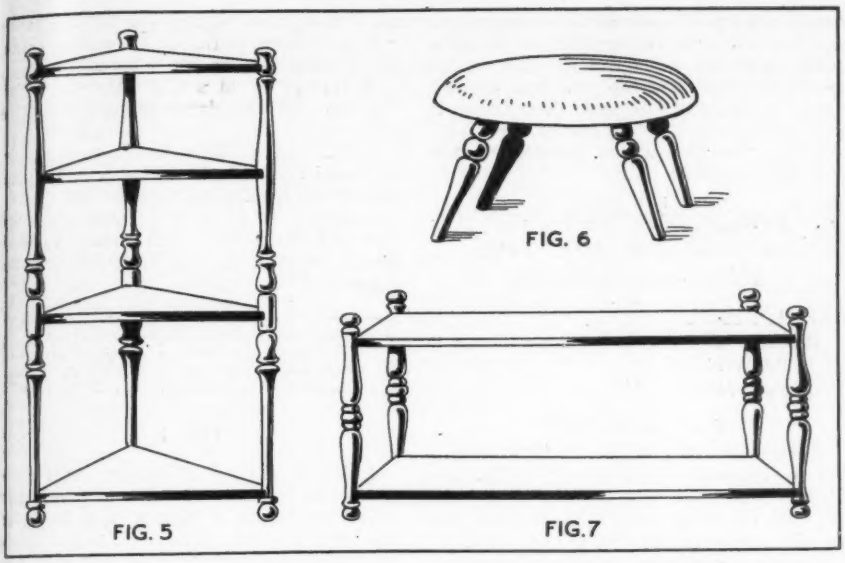


FIG. 5



FIG. 6



FIG. 7

hole is desirable. This novelty also could have been made in part from a chair leg.

Many legs and rungs of old-fashioned chairs have parts that may be made to represent small human figures with no alteration in shape. The tall figure shown in Figures 2 and 3 is made from very familiar chair legs. The upper end of the piece is trimmed to represent a hat, the lower end is mortised to a square of wood. Two simple arms cut from a dowel stick are swung loosely on small nails. A row of oversize pockets around the skirt make places for the materials of a sewing kit.

The two small figures have detachable heads and are hollowed out. They may serve as dime banks or as hiding places for bits of jewelry or they may hold tiny bottles of perfume.

Two matched pegs cut from chair rungs and mortised to a neatly shaped back may hold the ends of a towel rod, as shown at 1 in Figure 4.

An ornamental peg cut so that its ball-shaped part may be completely rounded, will, when mortised to a neat little piece of board, form a pleasing clothes peg, as shown at 2 in Figure 4. A row of such pegs might be placed on a board of suitable length, to accommodate a number of articles of clothing.

The middle part of a rung from the front of a chair may have a row of hooks placed on it and two screw eyes for hangers, as shown at 3. Such a little rack may be used to serve various purposes according to its size. It may be a rack for toothbrushes or perhaps for hot lifters or small utensils in the kitchen.

A rather plain rung will yield material for the paper knife shown at 4.

Two rungs, one more slender than the other, may be used to make a holder for a hanging plant basket, the slenderer rung mortised to the larger and securely pegged. See 5 in Figure 4.

Two short matched pieces of rungs may be used to make a book end as shown at 6. These may be put together in the form of a tiny Portal to the Land of Learning, the block of wood which forms the base having been cut from heavy wood to give weight to the book end.

Three or four rungs or parts of rungs may form the upright parts of small whatnots and sets of shelves of the various familiar types. See Figure 5.

A low footstool may be made of a circular or square piece of thick wood with four short pieces of heavy rungs, or of legs mortised deeply into it. A taller stool might need rungs between the legs to support them. See Figures 6 and 7.

## NAIL AND SCREW CHART

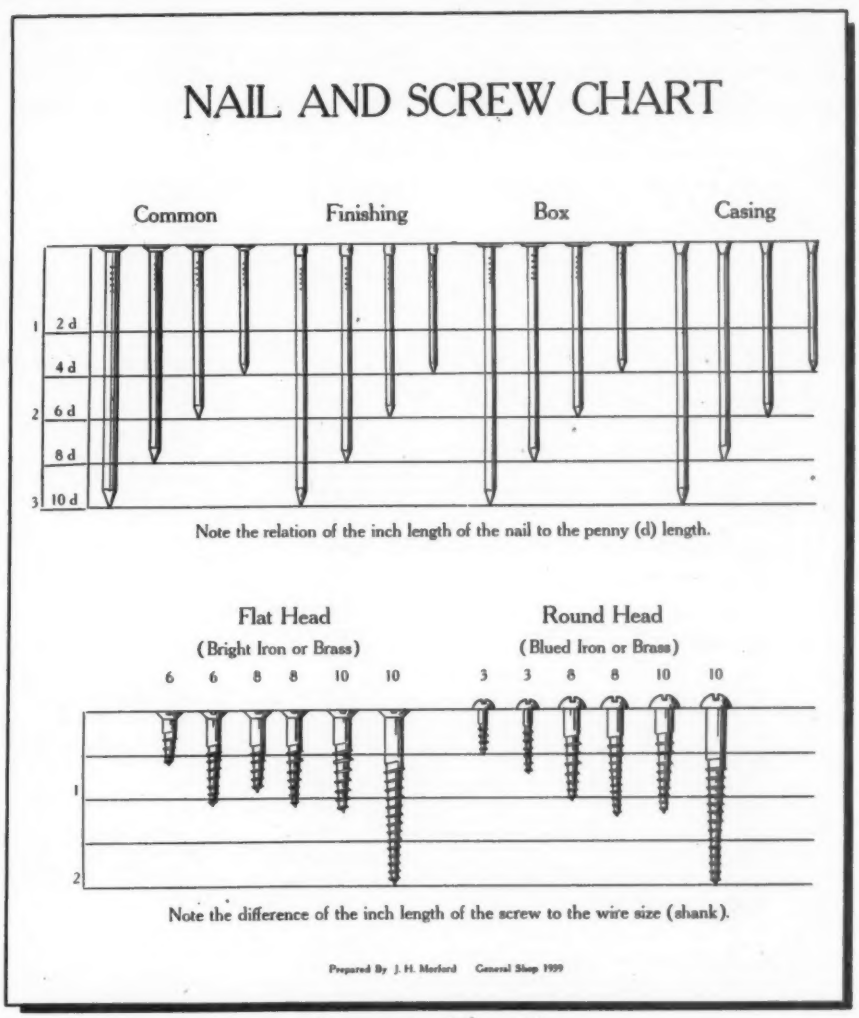
JAMES MORFORD

Oswego Normal School
Oswego, N. Y.

Objective teaching aids are becoming more recognized for their value within the shop. Permanent display teaching aids are a help to both the teacher and the student of the shop classes. Not only do they save the time of the instructor from repetition of many points, but they are a source of reference for the student concerning supplies or processes, and thereby save considerable time which otherwise would be lost.

The nail and screw chart, shown herewith, should familiarize the student with the most common types of nails and screws in use in the majority of woodworking or comprehensive general shops. Definite relationships concerning the wire gauge size and the length in inches of nails and screws are made evident in this chart.

From it, the student learns by observation that common nails have a much heavier head than box nails, and that they also are greater in diameter. Finishing nails are smaller in diameter than casing nails, and also have a smaller and different shaped head. A 10*d* (penny) nail is nearly 3 in. long in all types of nails, while a 2*d* nail is about 1½ in. long.




A good teaching aid

As the diameters of screw shanks increase, the screw number also increases. The length of screws may vary, from extremely short to extremely long within the same screw size. Flathead screws are measured from the top of the head to the point of the screw. Roundhead screws are measured from below the head of the screw to the point.

Suppose the student does not see this through his own observation, then perhaps a moment or so at the beginning of a class period will make these points plain. Then when the chart is hung in a convenient place the student will come to recognize what these terms mean. Through such visual teaching aids the student can be taught to increase his power of observation and his knowledge of information for classwork and materials around him.

## JENNY LIND END TABLE

REN ATON

Wichita, Kans.

This end table, when made of walnut, makes a beautiful piece of living-room furniture. It also would look well in other woods, such as gum or birch.

The construction of this table is simple but rigid. The top is fastened to the ends by means of four screws that fit in the holes where the doweled ends of the legs fit. The bottom shelf is held in place by the dowels on the bottom of the legs. These dowels pass through the shelf and are glued into the feet of the table. A templet may be used in turning out the legs. The drawer is of simple construction sliding in two grooves in the ends.

The table has a number of uses as can readily be seen. The top will hold a good-sized reading lamp and books. The drawer is large enough to hold stationery, cards, and ash trys. The shelf at the bottom will hold magazines or books.

## TYPICAL MACHINE-SHOP INSTRUCTION SHEET FOR NATIONAL DEFENSE

EARL L. BEDELL
Director of Vocational Education,
D. L. BROWN
Detroit, Mich.

### Drill Chuck Body

*Reason for the Job:* To teach taper turning by offsetting the tailstock, drilling and boring, chasing external threads, taper turning with compound, and using dividing head to mill tang and slot collet end of chuck.

*Safety:* Use of dead center against chuck, which is mounted on the spindle of the lathe, to keep the chuck from working loose during any operation.

*Materials:* One piece of ⅞ by 5¼-in. hexagonal S.A.E. 1112 steel.

*Tools:* One lathe, one power saw, one milling machine, one universal chuck, one r.h. facing tool, one center drill, one Jacobs chuck, one 1-in. micrometer, one ¾-in. 16 external thread gauge, one thread-cutting tool, one 6-in. rule, one scriber, one 1/16-in. radius turning tool, one drill, one flat milling cutter, one 1/16-in. wide milling slotter.

*Procedure:*

1. Get the tools and supplies from the tool crib.
2. Mark off a 5¼-in. length on the ⅞-in. hexagonal bar, with the 6-in. rule and scriber, and cut the stock with the power saw.
3. Mount the stock in the lathe chuck and face and center drill both ends. The stock should be 5 in. *plus* .010 after facing. See Figure 1.

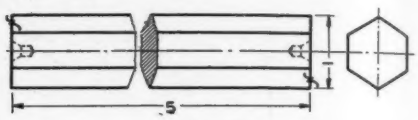



Fig. 1

4. Mount the stock between centers and turn down end *A* to the diameter and length shown in Figure 2. Use a 1/16-in. radius cutting tool for the offset.
5. Offset the tailstock and turn end *A* to a No. 2 Morse taper as shown in Figure 3.
   *a*) Calculate the amount of offset.
   *b*) Check the taper after a few trial cuts.

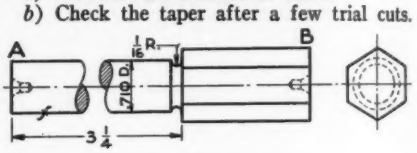
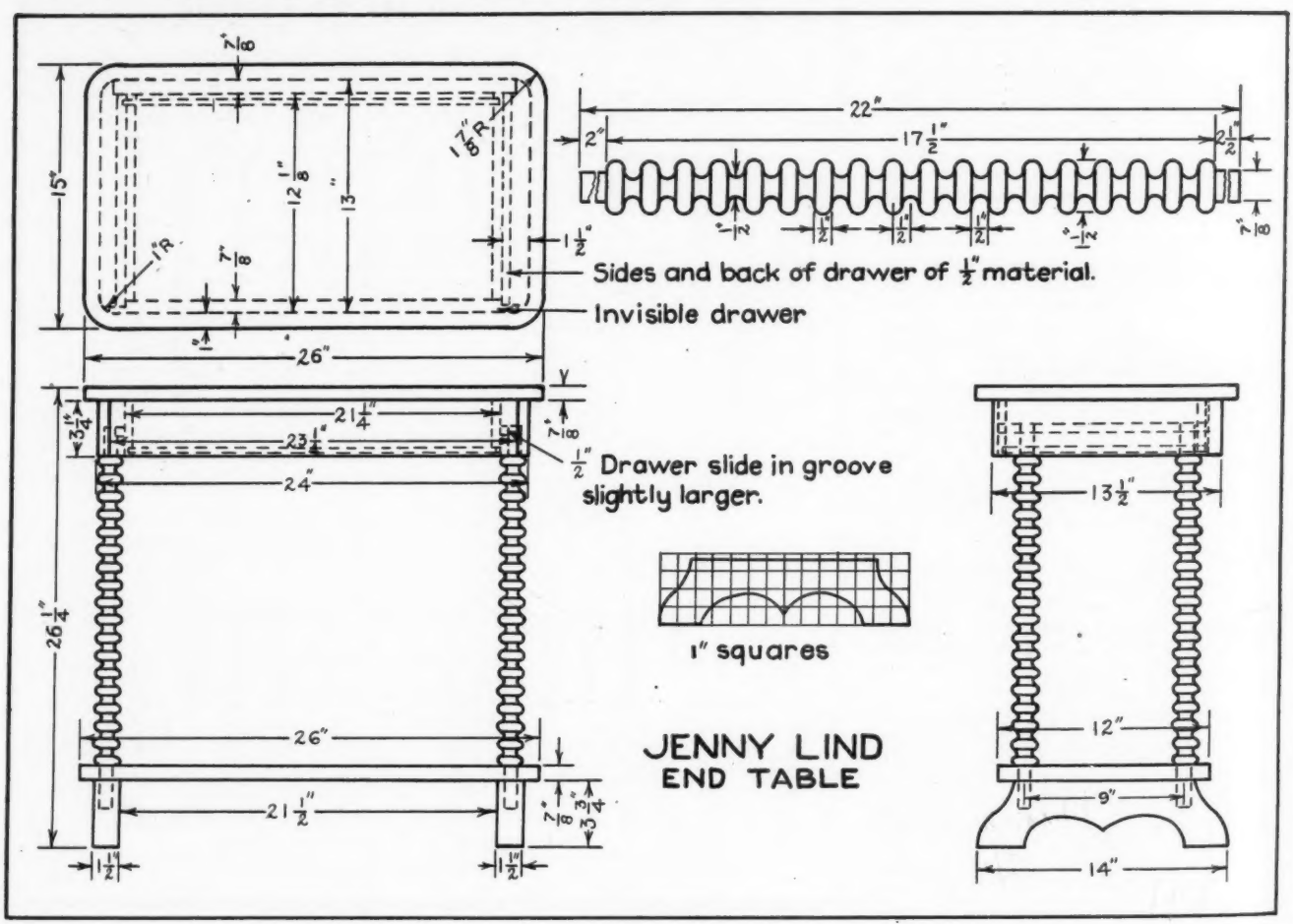



Fig. 2



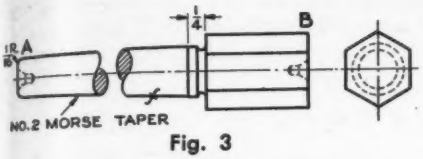



Fig. 3

*c*) Insert the finished taper and remedy any faults.

*d*) Cut the 1/16-in. chamfer at end *A*.

6. Insert the taper end *A* in the spindle and straight turn a .750-in. diameter, 1⅜ long at end *B*. See Figure 4.

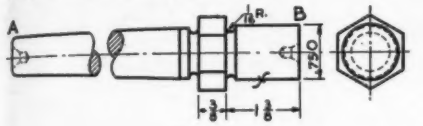


Fig. 4

7. Mount the thread cutting tool in the toolholder and chase a ¾ in.-16 NF thread at end *B*. See Figure 5.

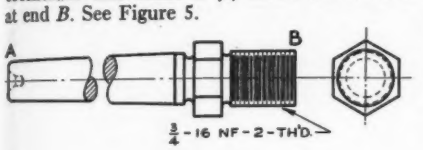



Fig. 5

*a*) Mount the tool bit carefully.

*b*) Check the gear train for 16 teeth per inch.

*c*) Inspect the finished thread with the thread gauge.

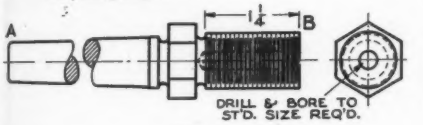



Fig. 6

8. Drill and bore the end *B* as shown in Figure 6. Ask the instructor for the size of the boring.

9. Cut the 30-deg. taper on end *B* as indicated in Figure 7. Set the compound rest at 75 deg. and use the hand feed compound rest.

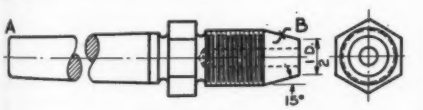


Fig. 7

10. Set up the job in the milling machine. Use an index head, and a flat milling cutter. Cut the standard No. 2 Morse taper tang as shown in Figure 8.

Fig. 8

11. Mill three slots, 1/16 in. wide, 1 in. deep, and 120 deg. apart as shown in Figure 9.

12. Take the completed job to the instructor for inspection. All of the dimensions are shown in Figure 10.

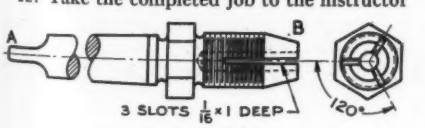



Fig. 9

13. Clean up the station and turn in all the tools and supplies.

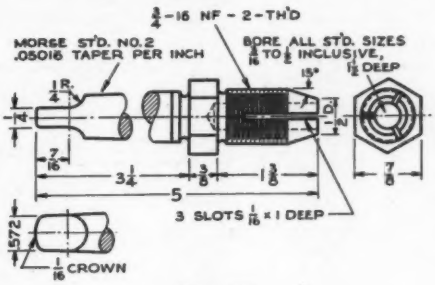



Fig. 10

*References: Advanced Machine Shop Practice* by Robert H. Smith.

*Questions:*

1. Why are all operations made with the taper in the spindle?
2. Why should the drill chuck be bored and not drilled?
3. Why is the taper relieved at the hexagonal end?
4. What standard taper does the live spindle of a lathe have?
5. Is the chuck taper turning done automatically or by hand?
6. Of what kind of steel is this drill chuck made?
7. At what angle is the compound rest set when cutting the threads?
8. How far is the compound rest fed into the stock when cutting the thread?
9. Is the cross-feed clutch disengaged during the cutting?
10. Why must the chuck be slotted in three places?

### Drill Chuck Nut

*Reason for the Job:* To learn how to do internal threading, internal angle turning (with the compound rest) and straight boring.

*Safety:* Always set the stops when boring blind holes as the strain of hitting the end of a hole may break the boring bar and injure someone.

*Materials:* One piece of S.A.E. No. 1112 steel ⅞-in. hexagonal 1¼ in. long.

*Tools:* One lathe, one universal chuck, one r.h. facing tool, one boring tool, one 6-in. rule, one scriber, one ½-in. drill, one E2 center drill, one ¾ in.-16 NF Plug gauge, one drill chuck.

*Procedure:*

1. Secure the tools and supplies from the tool crib.
2. Mark off 1¼ in. length on the stock and cut in the power saw.
3. Face one end.
4. Face the other end to 13/16-in. length and center drill. Figure 11.

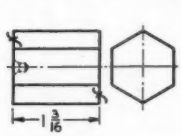


Fig. 11

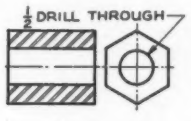



Fig. 12

5. Drill through center of stock with a ½-in. drill. Figure 12.

6. Counterbore 1 in. deep, 11/16-in. diameter. Figure 13.

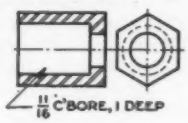



Fig. 13

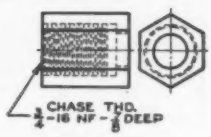



Fig. 14

7. Chase a ¾ in.-16 NF thread, ⅞ in. deep. Figure 14.

8. Bore a 15-deg. angle using ¾ NF Adapter to hold the part. Figure 15.

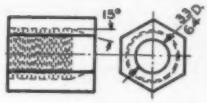


Fig. 15

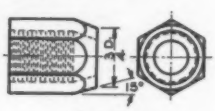


Fig. 16

9. Turn a 15-deg. angle with the compound rest and with the job mounted on ¾ in.-16 NF Adapter. Figure 16.

10. Take the complete job to the instructor for inspection. All of the dimensions are shown in Figure 17.

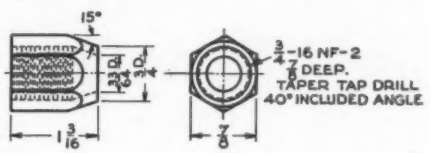



Fig. 17

11. Clean up the lathe and turn in all the tools and supplies.

*References: Advanced Machine Shop Practice* by Robert H. Smith.

*Questions:*

1. How may one check an internal thread other than using a thread plug gauge?
2. Why use an adapter when boring the angles?
3. Why is the stock center drilled at one end only?
4. What will happen if the boring tool is fed in .050 too far?
5. May a four-jawed chuck be used to hold this stock?
6. May a collet be used to hold this stock?
7. What is the purpose of the internal taper? Must the taper surface be smooth?
8. Should the compound rest be set to 15 deg. or 75 deg.?
9. What must be done in reference to the adapter?
10. What will result if the adapter is .005 off center?

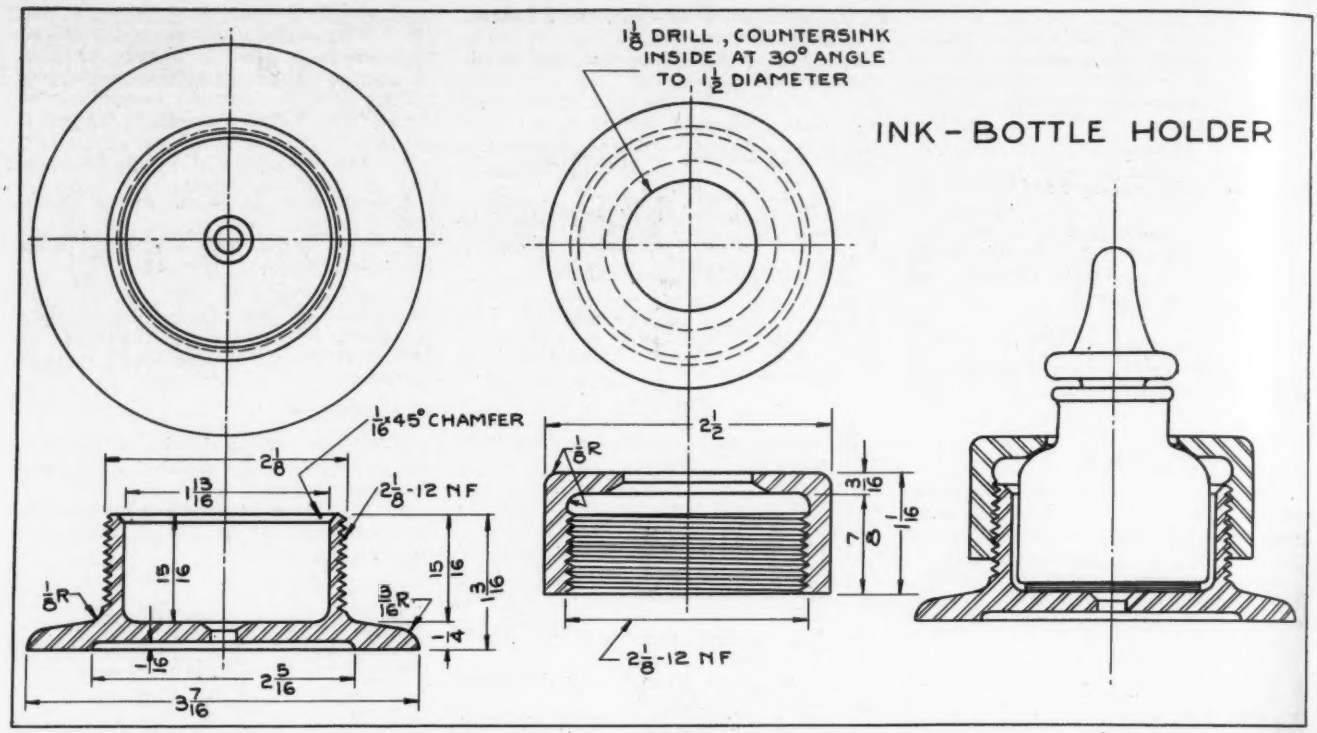
## INK-BOTTLE HOLDER

WILLIAM A. DE VETTE

Technical High School
Erie, Pa.

Several factors are essential in a good machine-shop project for school use. The materials from which the project is to be made must be readily accessible. A maximum number of operations should be possible with a minimum amount of material, and the project when completed should be of value to the school system without the necessity of selling it.

The ink-bottle holder illustrated in connection with this article includes all of these essentials. Bar stock up to four inches in diameter is available in all school shops.




In this particular instance the project also offers a good problem for the pattern shop if it should be so desired. The patterns for both parts can be made up individually and may also be made up on a match plate in groups for more rapid production. Then the castings can be supplied for about 10 to 11 cents a pair. In return for this small outlay for material quite a number of operations are necessary for the completion of this very useful project.

Upon completion, the ink-bottle holder may be turned over to the drafting rooms to be fastened to the desks. A considerable amount of ink may be saved annually by the use of these holders.

Interchangeability of parts may be included in the instruction by making a set of gauges for the threaded sections of the holder and cap, thus providing an additional project for the shop.

# Whittling-Jackknife Technique

W. BEN HUNT
Hales Corners, Wis.

(*Continued from page 80 of the February, 1942, issue*)

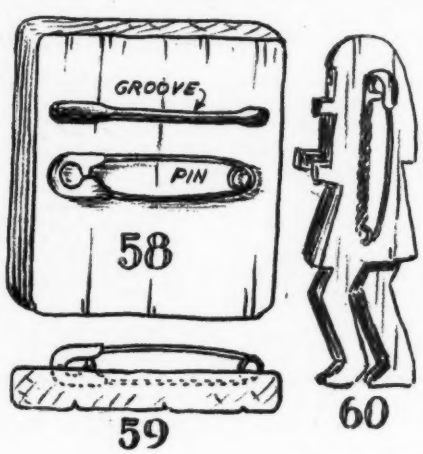
The present-day trend in jewelry seems to go toward the so-called "junk jewelry." Compared to expensive jewelry, that name is probably very appropriate, but nevertheless some of it is very attractive and there certainly seems to be quite a demand for it. But, as the same pieces are reproduced in such enormous quantities, duplicates are frequently seen. When this type of jewelry is designed by an individual and then made by hand, duplicates are rather scarce. The articles described in this issue are of Indian design, and if well made, they will attract a great deal of attention. Other designs may be developed that will be just as attractive.

Girls as well as boys can whittle these ornaments. Ensembles can be created to match any dress, not only in design, but also in color. Water-color paints and a coat of clear fingernail polish are all that is needed for finishing. The whittling part is simple. The knife must be very sharp.

The first thing to do is to study how the different units are constructed with regard to their respective functions.

### Lapel Pins and Brooches

The simplest way to fasten them to the coat or dress is with a common safety pin, the size depending upon the ornament. Figure 58 shows the notch or groove cut into the back. The safety pin should fit snugly and be set into the wood a little less than half way, as shown in Figure 59. After fitting, take the pin out of the groove, fill the groove with "liquid solder," or "aluminum solder," press the pin down into the groove, and if necessary add a little more "solder" to fill the groove level with the surface. Then let it dry.




For long designs, such as totem poles and katcina dolls, the pins should run up and down, as shown in Figure 60. If a clasp fastening is wanted, buy a cheap clasp brooch at the dime store, remove the clasp and fasten it to the back of the brooch for which it is intended with aluminum solder. Exact directions cannot be given because of the many different kinds of clasp jewelry on the market.

### Belts, Necklaces, and Bracelets

These are simple to fasten, as they are usually held together with cord for which holes must be drilled through the blankets with a 1/16-in. twist drill. Bore the hole as close to the back as possible without breaking through. For this reason the practical thing to do is to drill the holes into the blanks first. The blanks or units should be ¼ in. thick.

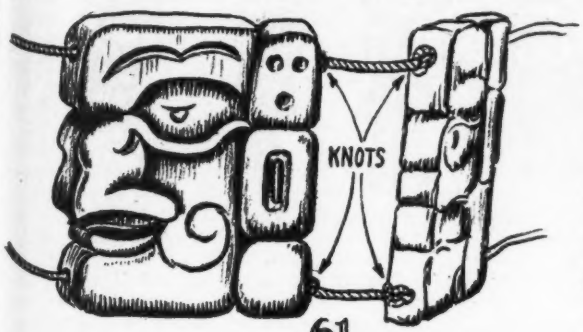
Figure 61 shows how belts and bracelets are drilled and strung. Necklaces, of course, need only be drilled at the top, as shown in Figure 66. The cord may be knotted or the units may be spaced with beads. For bracelets, use round elastic so that the bracelet may be slipped over the hand.

### Zipper Pulls and Necklaces

These may have a piece of the wood left standing for an eyelet, as shown in Figure 62 at the left, or a small screw eye may be screwed into the top of the figure as shown in the right-hand katcina doll in Figure 62. Zipper pulls are best made with a flat back, or still better, make only the front half of the katcina.

### Buttons

These are fastened by any one of the methods shown in Figures 63, 64, and 65. The one in Figure 63 has a depression whittled into the back of the button. This button must be tied onto the garment. The back of the button may also be whittled as shown in Figures 64 and 68 so that they may be fas-

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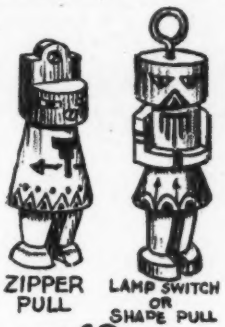


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63

64

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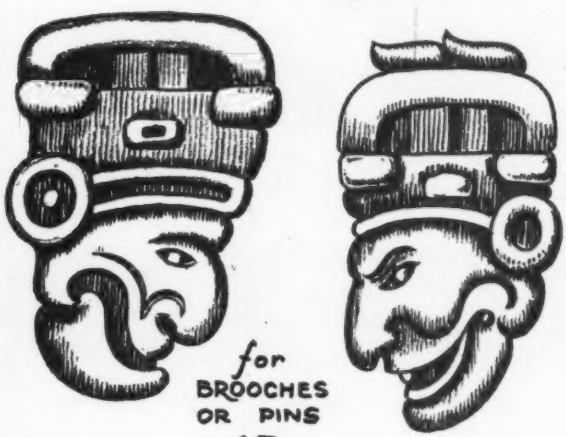
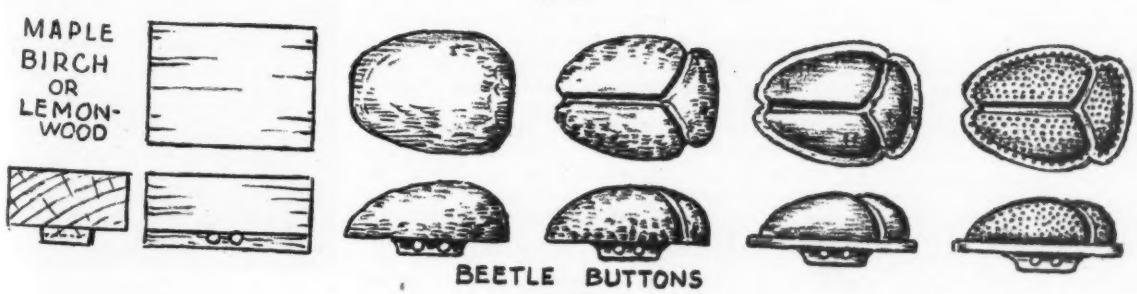



67

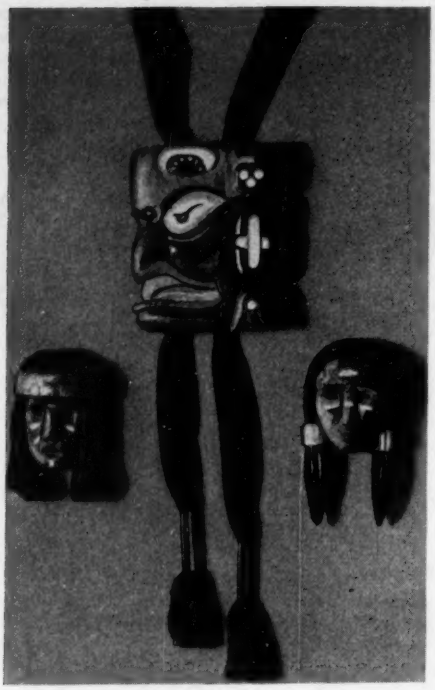
NECKLACE

66




BEETLE BUTTONS

68



Pendant and a pair of buttons, painted with water colors and lacquered

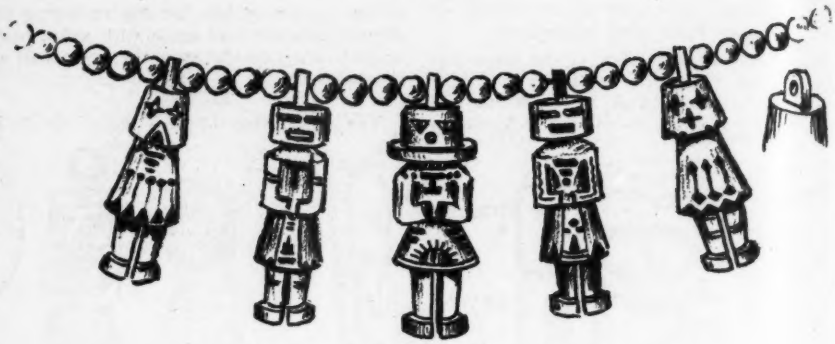
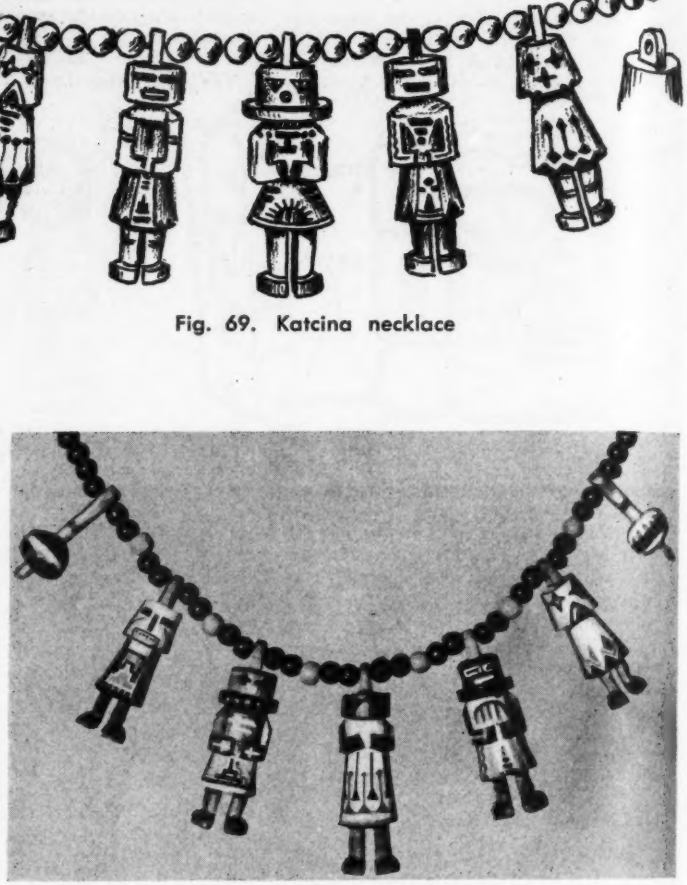


Fig. 69. Katcina necklace

Successive steps in the carving of a button



A striking katcina-doll necklace

tened in place by sewing. Another method is shown in Figure 65, where a small *D*-ring is set into the back and fastened with liquid solder as was described earlier in this article.

### Designs

The bracelet and necklace designs shown in Figures 61, 66, and 67, are taken from Mayan Codices. They are calendar numerals or parts thereof. These designs are interesting and unusual and look very well. Figure 67 shows two that are quite attractive when worn as brooches. Sandpaper them carefully after they are whittled and paint them. They should be painted in bright colors or in shades of terra cotta to resemble stone. The face part should always be Indian red regardless of how the rest is colored.

Katcina dolls are always attractive, as they are quite colorful. The first project in *Indian and Camp Handicraft* shows how they are made, and in the near future there will be another chapter or two on these and other idols and dolls, which also may be used for pins and necklaces.

In Figure 68 are shown the steps required to whittle beetle or scarab buttons. As they are rather small, it would probably be better if they were made of some harder wood than is ordinarily used for whittling. Birch, maple, or lemonwood are easy to whittle for these woods do not show any grain. Many kinds of beetles are very colorful and have interesting shapes. They may be found in books on insects at the libraries. The one shown here (Desmonota Variolosa) has a bright metallic green back and the edge is a metallic red. The little dots are made with a blunt end of an awl after the beetle is sanded and before it is painted. A little aluminum powder was mixed with the water colors to get the desired metallic finish, and one coat of clear nail polish was used for the final finish. These buttons were made to go through button holes. Where the buttons are only used for ornament, the beetles may be made larger and more elaborate, with feelers and legs.

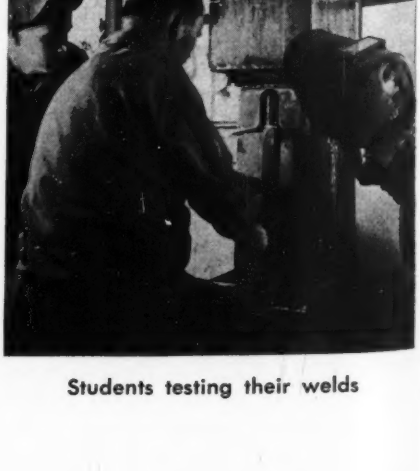
## BEND-TEST MACHINE FOR THE WELDING SHOP

Students at the Hobart Trade School, Troy, Ohio, produced the bend-test machine illustrated herewith. Since most employers demand the bend test in their qualifying examinations, students of welding are eager to make these tests themselves so that they may approach their future employer with confidence.

The sides of this test machine are made from two ½ by 18 by 60-in. steel plates. The sides are then notched out as shown. The piece taken out is 5 by 25 in., and the notch is cut 20 in. from the bottom. The notch is then boxed with ½-in. plates. Side plates are held apart by 1 by 1½ by 17-in. steel bars which also act as reinforcements at the top and bottom. The top front of the machine was covered with ⅛-in. steel for appearance.

A regular U. S. Navy bend die is used for the test, and the bending force is applied with a five-ton hydraulic jack. The top die is held in place by angle-iron slides so that the die may be removed. The bottom die is held in place by a piece of pipe fitted to the head of the jack, and welded to the bottom of the die.

The entire bend-test machine was built by arc welding at a slight cost.



Students testing their welds

## GRAPHIC-ARTS PROGRESS

R. RANDOLPH KARCH

Principal, Printing High School
Cincinnati, Ohio

Without appearing to peer wisely into the future, it is generally assumed that the war will have far-reaching and lasting effect on the graphic-arts industry. These effects can, for the purpose of discussion, be broken down as follows:

*Research* will probably be increased. For 1942, according to one survey, 208 establishments in the industries will spend 6/10 of 1 per cent of gross sales on research studies on equipment, supplies, and procedures. This is not much in an industry which employs 900,000 workers, has an annual pay roll of one billion dollars, and sales totaling about five billion. Research will probably be increased, and make room for many young men now studying the graphic arts in various types of schools. The wonderful traditions of the graphic arts make interesting study, but strict adherence to them will not make for progress. The fact that most type composition is still done by hand and by the methods Gutenberg used in 1450 is significant. It is hoped that forward-looking individuals and firms will increase their research efforts. The surface has been barely scratched.

*Paper* used in the industry has been wasted. One authority states that as much as 10 per cent is wasted. War conditions and shortages will bring about changes for more savings. Odd sizes and odd weights of paper have already been eliminated. Paper mills have brought to the attention of the general public that waste paper is used in the making of fine printing papers, a fact that was little known until the war. England's shortages have brought about interesting developments, among which is the new process of using an adaption of the silk-screen process of "printing" posters on walls and fences, which eliminates the use of paper. A campaign is now on to educate the public not to be greatly disturbed by the enforced lessening of wrapping paper. Undoubtedly there is terrific waste in wrappings. Other savings are apparent, especially in common goods, such as letterheads. One pound of paper can be saved on 1000 letterheads by reducing the size from the traditional 8½ by 11 in. to 8 by 10½ in. In this way it will be possible to save an enormous amount of paper in the United States each year.

*Platemaking* will probably change, the degree depending upon the continuance of the war. The supposition that halftones must be made on copper is no doubt one of the aforementioned traditions, and the future will see a spiraling use of plastics as well as new alloys, which will be just as good at less cost. Research will continue with cylindrical engraving, which is already being done. Mechanical engraving by use of the photoelectric cell is an interesting process to watch. Dry offset plates, which can be used in printing without water or etch on an offset lithographic press and at lithographic press speeds, will probably be in use more in the very near future. Experiments are being made in the manufacture of iron electrotypes — the present scheme uses copper. Iron can be deposited on a wax mold in the same fashion.

*Rubber*, a substance used more and more in the graphic arts, will, of course, be impossible to get while the eastern war lasts. Printers look hopefully toward the synthetic rubbers which can be made from a variety of ingredients: petroleum and coal, guayule (the Mexican shrub) which can be grown in California, Texas, New Mexico, and Arizona. The Russian plant named Kok-Sagyz, similar to our dandelion, can be grown almost anywhere in the states. The up-to-now increasing use of rubber form rollers for printing presses will probably have a setback, and the composition roller of glue, glycerine, and molasses will have to suffice. The rubber plates, hand cut and molded and vulcanized seem doomed for the present, just when they were making such splendid progress.

*Tin* will be conserved by the elimination of the coating on stitcher wire, and ink cans will be larger. Savings will be made also in the electrotyping industry.

*Printing Inks* will suffer not only from the tin shortage, but also from the fact that much material is imported: tung oil (for which a substitute can be found), china-wood oil, and Chromite. No shortage exists at present in linseed oil.

*Labor* indubitably will be a problem of printers and lithographers in the months to come. Indeed some are already feeling the pinch. Young men are either enlisting in the armed forces, or being drafted, or are leaving the trades to take up work in defense industries. Defense work pays more wages, and there is hope that draft deferments will be enjoyed by those who operate machines in machine shops and other factories doing war production. Graphic-arts schools on the vocational level have already been squeezed between two hard-hitting factors: lack of new students in the lower grades who are attracted to the mechanical type of school, and the enticing demand that the students in the higher grades quit school and go to work on full time. Printers will probably sit around in the traditional fashion and weep about this condition, but will do nothing to alleviate the condition. During the past years, from the depression to the present, little interest has been shown outside of schools in training men for the graphic arts. Now the age-old program of offering a young man a few cents more on the hour will probably cause a continuous procession of workers from one shop to another. Overtime work will be necessary to get out the jobs, and this increases hour costs even where overtime pay is not increased. Evening schools devoted to graphic-arts training will also suffer in decreased enrollment, because of the natural inertia of workers, and because of the overtime and steady working conditions. Printers and lithographers could encourage their unskilled help to gain money-making skills in evening schools, but they probably will not do so. They will wag their heads, and wonder what will happen to their labor situation, and what this country is coming to.

## A PERPETUAL INVENTORY OF THE PAPER STOCK

E. K. WHITESITT

Wichita High School East
Wichita, Kans.

Keeping a reasonably accurate perpetual inventory of the paper stock can be accomplished by means of the four forms illustrated herewith. At the same time, students can learn some facts about paper. If the printing shop is organized on the plan of having student foremen in charge of the several departments, with other students acting as stockman, office manager, estimator, and the like, this system will give each boy an opportunity to assume shop responsibilities, as well as for him to learn much about grades, brands, sizes, colors, weights, and finishes of paper.

Assuming that one student, as office manager, or in charge of planning, writes up and starts the job envelope on its way through the shop, he will make out the stock cutting

P.D.2.10-10-37

**STOCK CUTTING ORDER**

Job No. 494 Form No. — Description program, junior class play

Cut 1 on copies 12 X9 from

Stock Lexicon Antique

Size 25 X38 Weight 70 Color white Finish wove

No. sheets 134 Spoilage—copies 72

Cut by Date

Time Deliver to Press No. 4

STOCK MAN: Make a cutting diagram. When approved, cut stock to order. When finished, insert order in file of stock.

Fig. 1

P.D.2.9-27-37-5M

**RECORD OF STOCK CUT**

Date Nov. 4 Stock Man Chester Johnson Foreman Harold Kemper

| JOB NO. | NO. SHEETS | STOCK | SIZE | WEIGHT | COLOR | FINISH |
|---|---|---|---|---|---|---|
| 494 | 134 | Lexicon Antique | 25X38 | 70 | white | wove |
| 497 | 70 | Compass Bond | 17X22 | 20 | green | wove |
| 487 | 130 | Hammermill Bond | 17X22 | 24 | white | wove |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

Foremen of Bindery: This form is to be filled out and returned each day to the Office Manager.

Fig. 3

order shown in Figure 1, at the same time. If he also is responsible for the choice of paper stock for the job, he should have access to paper sample cabinets. A shop file form is turned in to the shop's office, where it becomes one of the means of keeping the perpetual inventory record on the form shown in Figure 4. The paper used each day can be

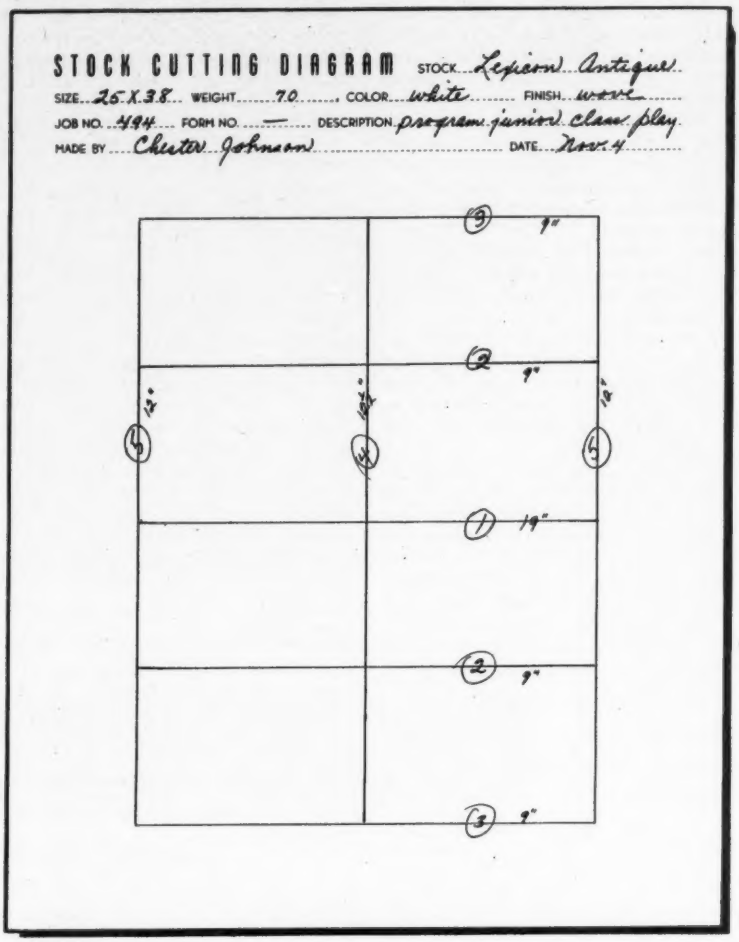



Fig. 2

of paper samples can be made up by cutting pieces 6 by 4 or 8 by 5 in., of each item of paper kept in the stock room. A sample of each stock envelope can be included in the file. On each piece can be printed, typed, or written, a brief description of the paper, and the source from which it was obtained. Price notations can be made on each slip or envelope, or reference should be made to jobbers' price lists.

The stockman, upon receiving the stock cutting order, will fill out the stock cutting diagram sheet shown in Figure 2, and diagram the various cuts he intends to make in order to get the required number of pieces out of each sheet. Each cut should be numbered in progression, and the gauge setting indicated on each cut. This form should be approved by his teacher or the student foreman in charge, before the cutting is begun.

After the stock is cut, the card is inserted in a lift of stock, and then the paper is sent to the press on which the job is to be printed. When the job is finished, the card should be placed in the job envelope.

The stockman fills in a line on the record of stock cut, as shown in Figure 3, when he finishes cutting. At the end of the period this deducted from the remainder shown on the proper sheet. Any paper received during the day should be checked against the invoice and the quantity added to the inventory on an old or new sheet, as needed.

## SMOKING STAND

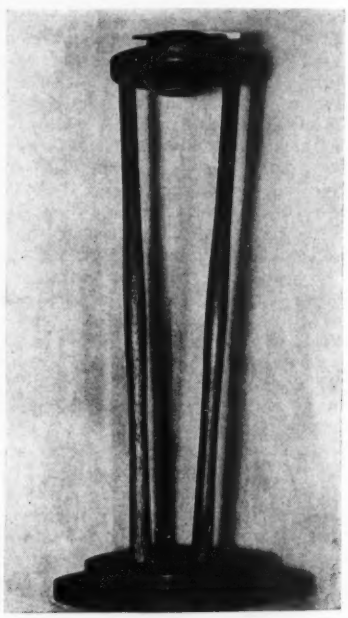
C. C. COOLEY

Greensboro, N. C.

This junior-high woodshop project has a touch of novelty, and yet is conservative enough so that it will form a harmonious part of the furniture of any room.

Two kinds of wood are relied upon to furnish the color contrast. In the project illustrated, poplar and mahogany were used, but, of course, any two woods with color contrast may be substituted.

The first parts to be made are the two uprights, one being made of mahogany, and the other of poplar. These are turned on the lathe. Turn straight cylinders 1 inch in



The finished smoking stand

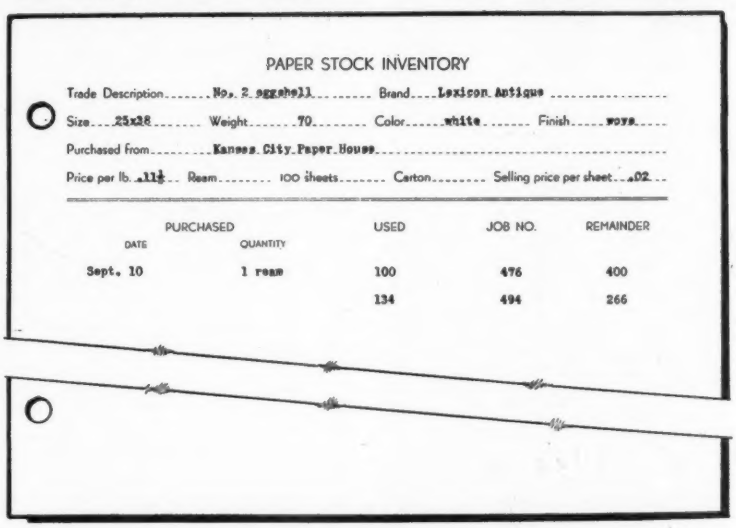
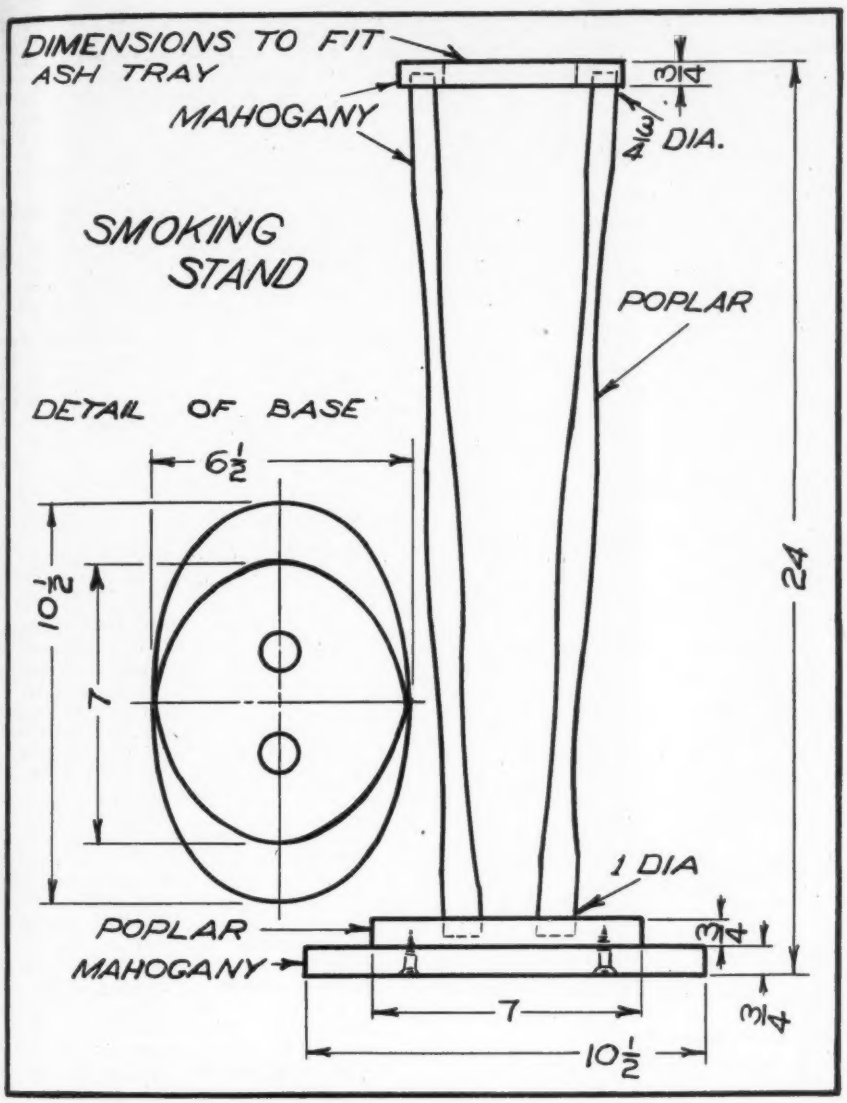



Fig. 4




diameter first, and then cut the double taper to form the simple design. The lower ends of the cylinders are 1 in. in diameter, and the upper ends are ¾ in. in diameter. Make these measurements exact, to assure a snug fit when mounting the top and base.

Next come the two pieces for the base. One is made of poplar, and the other of mahogany. The best way to draw the ellipses on the stock is the old trial and error method using two nails, string, and a pencil.

Now make the toppiece. It is best to make this fit a particular ash tray. This piece may be cut in the form of a circle, but an ellipse is preferable, as it carries out the shape of the base.

This will complete the parts, and next come the assembly. The two baseboards are fastened together with flathead screws through the bottom. Then carefully drill the holes for the uprights, and assemble with a good grade of glue.

The best finish for a job of this type is to use linseed oil. After it has had a chance to soak in, wipe off the surplus with a cloth, and finish with shellac or varnish, using fine steel wool between coats. Finish with pumice stone and wax.

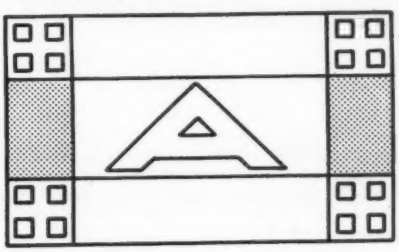
The most useless thing in the world is that part of a careless man that he leaves in a piece of machinery.

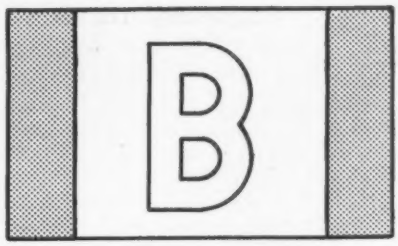
*— Source Unknown*

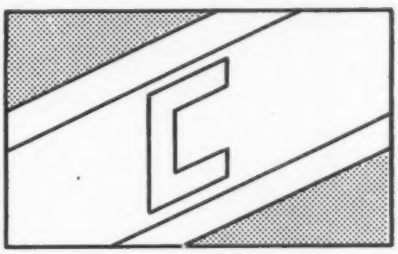
## LEATHERCRAFT DESIGNS

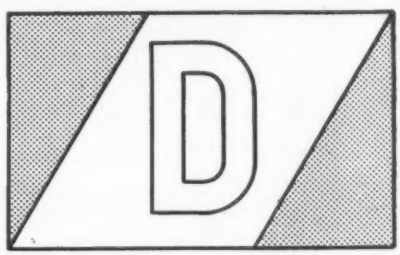
J. R. HANKISON
Junior High School
Logan, Ohio

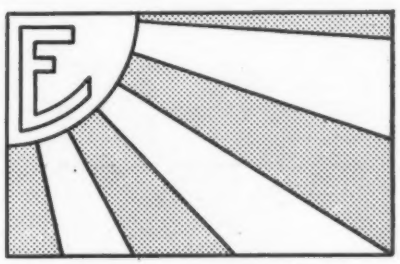
The following designs have been found useful on billfolds, streetcar pass folders, and other similar projects.

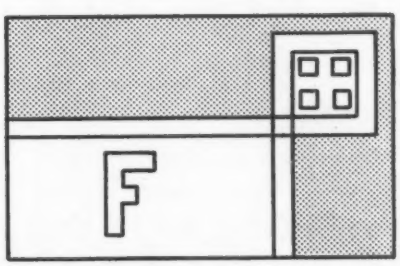


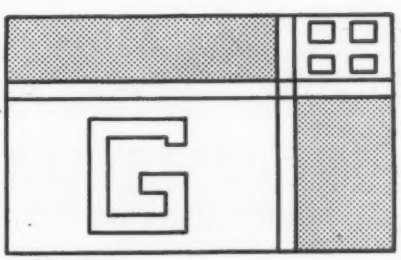



## EQUIPPING THE SCHOOL PRINTING DEPARTMENT

R. Randolph Karch

(See article on pages 151 to 154)

| | No. of Students | Size Platen Press | Size of Cylinder Presses | Size Cutter | Style Proof Press | Saw | Stitcher Style | Punch or Drill | Perforator | Folder | Stereotype Unit | Virkotype | No. and Style Type Cabinets | Style Imposing Tables | Style Galley Cabinets |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Junior High School | 6 to 10 | 10x15 | | 19 1/4 | 099 | | A | | | | | | 3 No.19191 | No.13967 | |
| | 12 to 15 | 10x15 | | 26 1/2 | 1 | | A | | | | | | 6 No.19191 | No.13978X | |
| | 16 to 19 | 10x15 | | 26 1/2 | 1 | | A | | | | | | 8 No.19191 | No.13978X | No.13538 |
| | 20 to 23 | 8x12 12x18 | | 26 1/2 | 1 | | A | | | | | | 10 No.19191 | No.13983X | No.13538 |
| | 24 to 30 | 8x12 12x18 | | 26 1/2 | 1 | | A | | | | | | 12 No.19191 | No.13983X | No.13540 |
| Senior High School | 8 to 10 | 12x18 | | 19 1/4 | 099 | | A | | | | | | 2 No.12013D | No.13967 | |
| | 12 to 15 | 12x18 | | 26 1/2 | 1 | | No. 5 | punch | | | | | 3 No.12013D | No.13978X | |
| | 16 to 19 | 12x18 | | 26 1/2 | 1 | | No. 5 | punch | | | | | 4 No.12013D | No.13978X | No.13538 |
| | 20 to 23 | 8x12 12x18 | | 26 1/2 | 1 | | No. 5 | punch | | | | | 5 No.12013D | No.13983X | No.13538 |
| | 24 to 30 | 8x12 12x18 | | 26 1/2 | 1 | | No. 5 | punch | | | | | 6 No.12013D | No.13983X | No.13540 |
| Vocational School | 16 to 23 | 8x12 10x15 12x18 | | 30 1/2 power | 2 | ATF | No. 4 | drill | 20" | Liberty No.90 | 8x12 | B-36 | 4 No.12010XE | No.13983X | No.13540 |
| | 24 to 32 | 8x12 10x15 12x18 | 17x22 | 34 1/2 power | 2 | ATF | No. 4 | drill | 24" | Liberty No.90 | 8x12 | B-36 | 5 No. 12010XE 2 No.12042E | 2 No.13983X | No.13540 |
| | 32 to 40 | 8x12 10x15 12x18 | 17x22 | 34 1/2 power | 2 | ATF | No. 4 | drill | 24" | Liberty No.90 | 8x12 | B-36 | 7 No.12010XE 2 No.12042E | 2 No.13983X | No.13540 |

| | Storage Cabinets | Proof-reader Desk | Press-room Cabinet | Drying Rack | Chase Rack | Make-ready Table | Cutter Table | Bindery Table | Size Trucks | Lb. Type No. Fonts | Room Size | Approx. Cost (Dollars) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Junior High School | | | No.15098 | | | | | | | 90 lb. 24 fonts | 15x21 | 1896-2044 |
| | | | No.15098 | | | | | No.15038X | | 160 lb. 26 fonts | 22x30 | 2886-3128 |
| | | | No.15098 | | | | | No.15038X | | 200 lb. 26 fonts | 22x40 | 3251-3532 |
| | | | No.15099 | | | | | No.15038X | | 240 lb. 26 fonts | 22x45 | 4419-4807 |
| | | | No.15099 | | | | | No.15038X | | 280 lb. 26 fonts | 22x50 | 4761-5184 |
| Senior High School | | | No.15098 | | | | | No.15038X | | 120 lb. 26 fonts | 16x27 | 2283-2478 |
| | | | No.15098 | | | | | No.15038X | | 190 lb. 39 fonts | 22x30 | 3416-3689 |
| | | | No.15098 | | | | | No.15038X | | 230 lb. 39 fonts | 22x40 | 3777-4092 |
| | | | No.15099 | | | | | No.15038X | | 330 lb. 37 fonts | 22x45 | 4834-5239 |
| | | | No.15099 | | | | | No.15038X | | 370 lb. 37 fonts | 22x50 | 5176-5620 |
| Vocational School | No. 12405‡ | No. 15258 | No.15115 | No. 15130 X | | No. 15247 A | No.15049X | No.15038X | 19x25 | 290 lb. 78 fonts | 22x60 | 9646-10259 |
| | 1 each No.12442 No.12405‡ | No. 15258 | No.15115 | No. 15130 X | No. 15230 | No. 15247 A | No.15049X | 2 No.15038X | 2 19x25 | 380 lb. 78 fonts | 22x72 | 16132-16954 |
| | 1 each No.12442 No.12405‡ | No. 15258 | No.15115 | No. 15130 X | No. 15230 | No. 15247 A | No.15049X | 2 No.15038X | 2 19x25 | 460 lb. 78 fonts | 22x80 | 16899-17807 |

**Typical Printshop Equipment Chart**
**Presenting manufacturers' item numbers, number of students accommodated, probable cost of equipment, room size, etc.**

### MAKE PROJECTS ATTRACTIVE!

The teaching of the correct and efficient use of hand tools is the basic job of the woodworking instructor and his effective handling of a difficult job is a thing to be marveled at. All too often, while doing this job well, he neglects an equally important necessity of selling the public on what he is doing.

The average project is very plain in appearance, and while it may illustrate extreme accuracy in handwork, it lacks the appeal that would attract favorable comment or make it an acceptable addition to household furnishing.

The lack of sufficient time and the rarity of the natural craftsman who can do inlaying, panel work, or make molding cuts by hand, points to the necessity of some type of machine that the students can use to dress up their projects.

**Using the router for cutting dovetails**

The router is a very useful tool in the school shop or in industry for decorating projects. A portable router revolves at about 18,000 r.p.m. A threaded casing, on which the base screws, provides an accurate and safe way of adjusting the depth of cut to be made with the router bit. Each turn of the *Carter R4 Router* as shown advances or retracts the bit 1/16 in., and each quarter turn, 1/32 in. The light portable router can be safely and easily operated by practically any student and is ideal for placing of ogee, chamfer, rounding over, cove, and other moulding cuts on projects. It is equally useful for panel work, inlaying, and templet work.

There are all types and shapes of bits that can be used in these portable routers.

Dovetailing is another application of the router. Practically any student can cut a dovetail corner, both pieces being cut at the same time up to 13 in. wide, in a minute or minute and a quarter.

Remember, to sell your department and yourself to the public, you should turn out work that not only has accurate handwork but that is also finished or dressed up in such a manner that it shall attract favorable comment.

## GAS HAND TORCH

JOSEPH J. LUKOWITZ
Milwaukee, Wis.

(See illustration on page 14A)

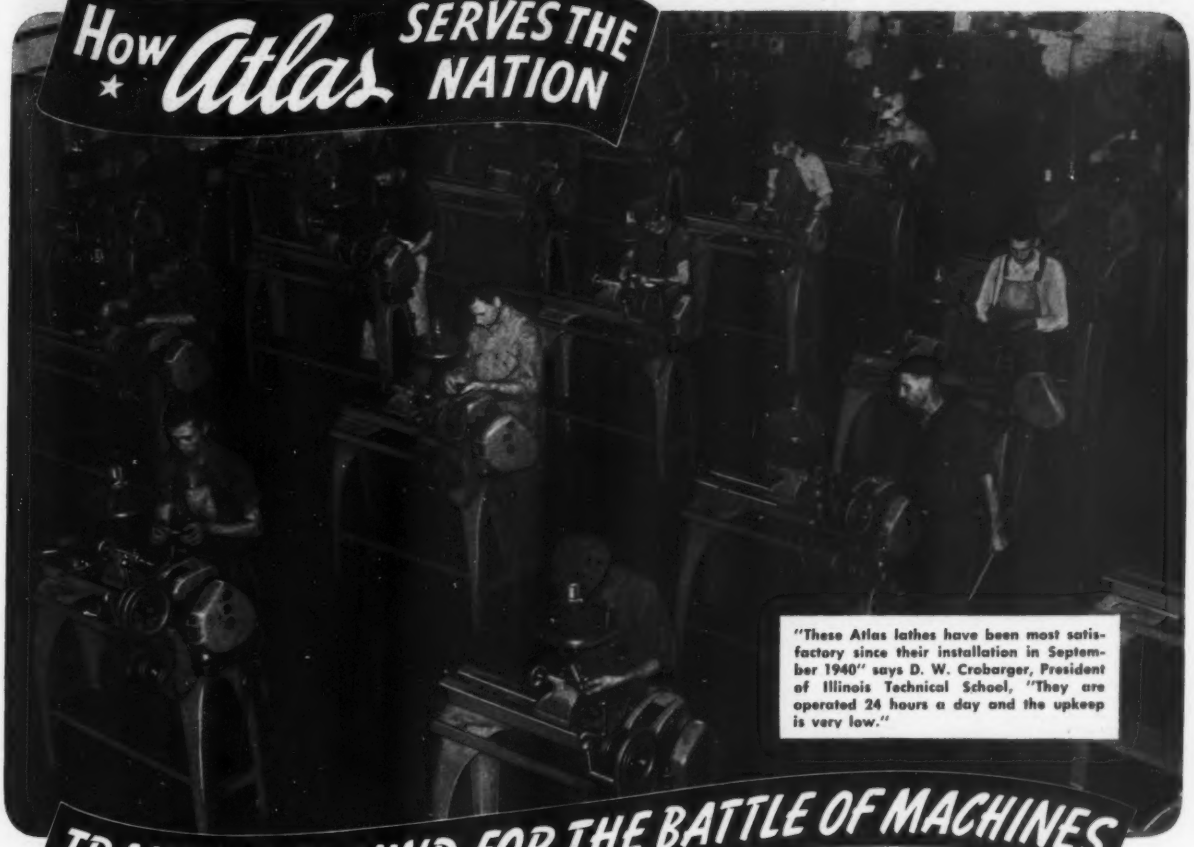
A gas hand torch such as is illustrated at *A*, is a very useful piece of equipment for the metal shop. It may be used for soldering, sweating, annealing, preheating molds, and in producing certain finishes on metal projects where heating is required. The simple expedient of fitting a piece of pipe, such as is shown at *C*, over the end of the torch will convert the torch into a powerful bunsen burner.

The air holes in pipe *C* should be large enough to provide sufficient air so that the maximum heat units will be obtained from burning the proper mixture of air and gas. The size of the gas outlet and the area of the air holes depend somewhat on the quality and the pressure of the gas. For average gas pressures a 1/16-in. gas opening, or less, and eight 5/16-in. air holes drilled in pairs in the mixing tube *C*, will provide a good mixture. Locate the air holes so that the lower part of the holes will be about in line with the gas outlet. When so arranged, the gas, as it rushes out of the hole in the plug, will siphon air into the tube through the air holes. The mixing tube should be at least 6 in. long so that the gas and air will be properly mixed before reaching the top of the tube. It is very important that all burrs be removed from the inside of the tube as a slight burr is very likely to cause the flame to backfire and burn inside of the tube instead of at the top. The hole in the plug should be countersunk on the underside of the plug so as to facilitate the flow of gas and direct it straight up through the center of the mixing tube.

In some communities it may be difficult to obtain ⅛-in. pipe. In that case ¼ or ⅜ in. will do. Similar torches may be improvised by using automobile gas-line fittings or pipe and fittings from discarded gas-light fixtures.

The stand for holding the torch upright on the bench should be well fastened to the pipe so that there is no possibility of the torch falling over on its side thus creating a serious fire hazard. The two holes in the ends of the stand are for placing over brads driven into the bench. When the stand is set down over the brads there is no possibility of the torch being accidently pushed off of the bench or against the wall. On metal-top benches flat-head rivets may be soldered to the bench top to serve the same purpose as the brads.

# How ★ Atlas SERVES THE NATION



"These Atlas lathes have been most satisfactory since their installation in September 1940" says D. W. Crobarger, President of Illinois Technical School, "They are operated 24 hours a day and the upkeep is very low."

## TRAINING GROUND FOR THE BATTLE OF MACHINES

The weeks just past re-emphasize the vital national need to train new thousands and tens of thousands of men to produce more and more weapons of war — at once! The picture above shows better than words how capably America's vocational schools are responding. Illinois Technical School in Carterville, Illinois operates twenty-three Atlas F-Series lathes twenty-four hours a day to give 240 adult students the "know-how" and feel of actual production.

Training today on the tools they will use tomorrow gives students confidence and speeds up orientation to actual production jobs. For this reason and because Atlas equipment gives them more tools for their money — vocational educators are increasingly specifying Atlas Lathes, Shapers, Drill Presses, Arbor Presses, and Milling Machines.

Adult students in training classes at Illinois Tech produce actual ordnance parts for Rock Island Arsenal on Atlas lathes.

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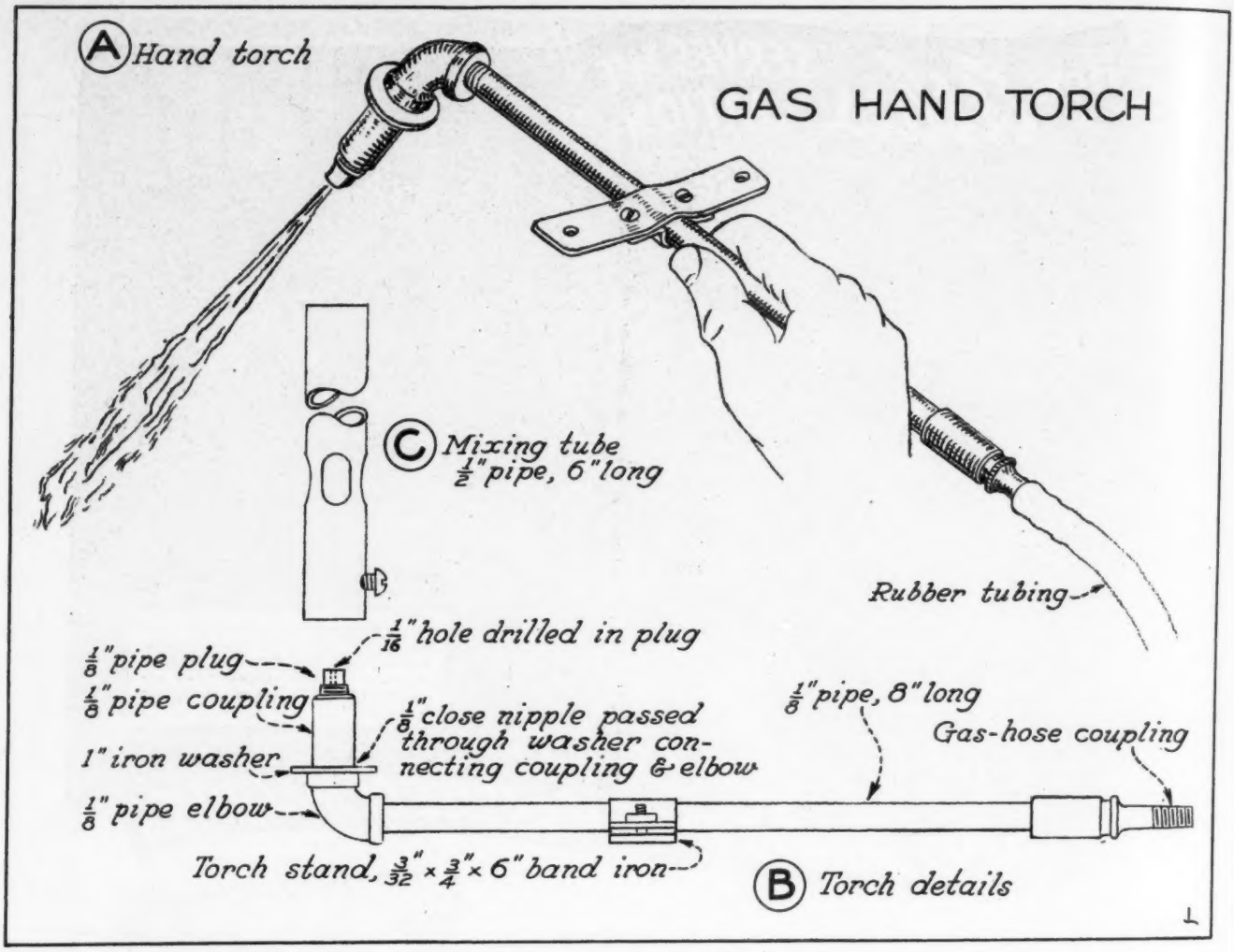
A Hand torch
GAS HAND TORCH
C Mixing tube
½" pipe, 6" long
Rubber tubing
1/16" hole drilled in plug
⅛" pipe plug
⅛" pipe coupling
1" iron washer
⅛" pipe elbow
⅛" close nipple passed through washer connecting coupling & elbow
⅛" pipe, 8" long
Gas-hose coupling
Torch stand, 3/32" × ¾" × 6" band iron
B Torch details

Fig. 1. Gas hand torch

## RECORD SHEETS, AND STUDENTS' CASH RECEIPT

HOMER C. ROSE
Southern Illinois State Normal School, Carbondale, Ill.

The shop-record sheet, shown in Figure 1, has a number of novel features and several advantages over other methods of recording student progress.

1. It fits a standard 8½ by 11-in. loose-leaf notebook.
2. Has double thickness of paper at the rings to prevent tearing.
3. Will hold three times as many grades.

(Continued on page 16A)

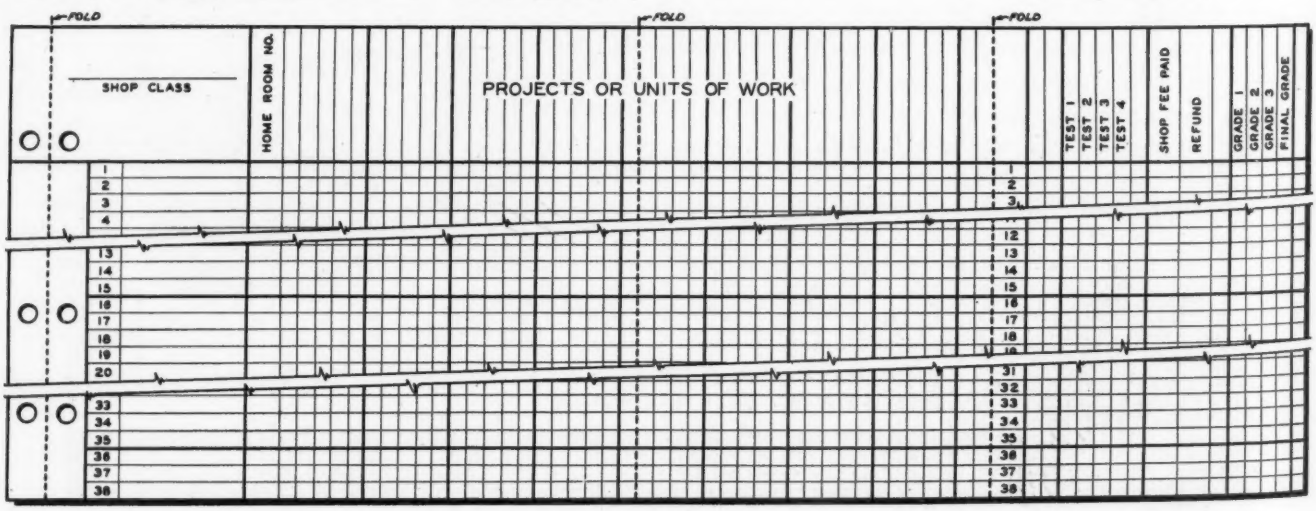


Fig. 1

# THIS Practical Shop Bulletin will keep you in touch with latest Industrial Shop Developments

**"Tooling Tips" is a condensed, up-to-the-minute report of the latest machine tool short-cuts, ingenious special set-ups and new adaptations of machine tools.**

**This bulletin was originally prepared exclusively for the plant man who demanded practical information with photographs and full details about the new medium weight machines that have been adopted by industry by the hundreds of thousands. However, it also serves as a valuable aid to the shop instructor by making available to him the same vitally important information that goes to shop executives out in the field; by keeping him in touch with actual operating conditions of the machines his students will use in actual industrial work and by enabling him to tie in with the war production program. The shop instructor who receives this bulletin will be as well informed about the newest machine tool installations as the men in industrial plants.**

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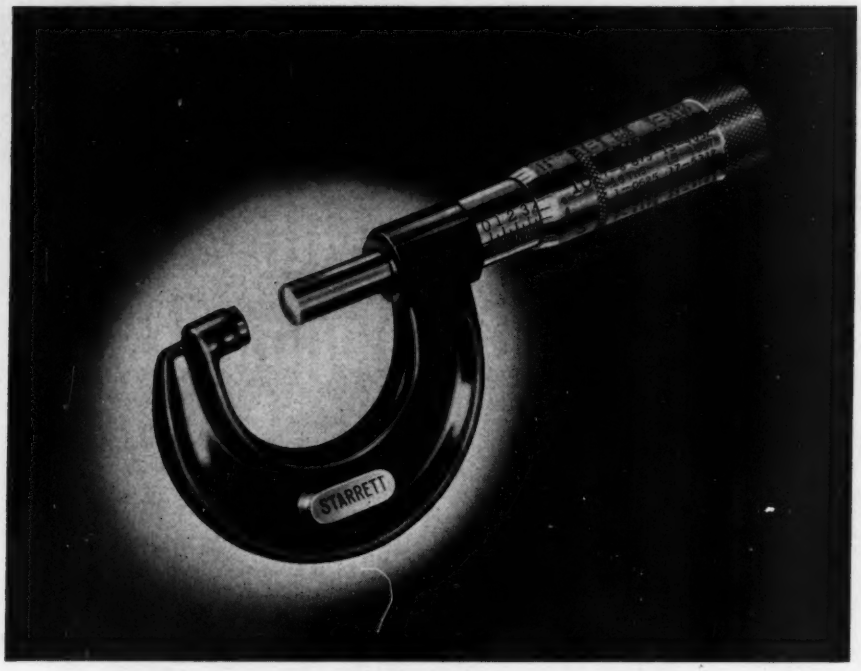


## More Precious Than Jewels . . .

**Never before has the value of fine precision tools and a knowledge of how to use them been as much appreciated as it is today. Whether the boys you are now training use their skill in the drive for Victory or during the peace that follows, they will be members of an honorable profession in which accuracy is a matter of pride as well as of livelihood.**

**FOR YOUR SHOP CLASSES.** **The new Starrett Book for Student Machinists provides essential information about tools, machines and modern metal working methods. Prepared in cooperation with leading vocational training experts, it is clearly written, profusely illustrated and contains over 30 reference tables. Only 75 cents per copy at your Starrett Tool distributors.**

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**ATHOL MASSACHUSETTS U. S. A**

# STARRETT TOOLS

(Continued from page 14A)

etc., as a single sheet or 8½ by 11-in. paper.

4. Important summary items are grouped to facilitate a final estimate of the student.

5. When the sheet is folded these items are near the students' names — this means less eyestrain at report-card time.

6. There are two columns of numbers so that it is not necessary to follow out on the chart more than 6 in. to record a grade.

7. The heavy lines that are spaced at equal distances tend to make it less difficult to locate the proper squares for a grade.

8. The squares are large enough, making recording less difficult.

9. The sheets may be filed in a standard file folder after the course is finished.

10. The student's record for the full semester may be viewed at one time without turning several pages.

11. Test papers, etc., may be placed within the folded record sheet for the day, thus keeping them separate from those of another class.

12. The right section may be folded over the center section, and the back of it used if additional space is needed for absence records, special notes on students, and the like.

13. One tracing may be made, and black or brown line prints made for all shop classes.

The record sheet has been welcomed by other shop teachers and has proved very adaptable to their needs.

### Student-Progress Sheet for Squaring Stock

While shop teachers agree that it is important for the student to be able to square up a piece of stock, they disagree on how much drill work should be done. It has been thought by some, that drill on this skill often discouraged the students and that standards of construction might better be lowered than to kill student interest by insisting that he memorize and follow a set procedure.

| Student's Name | NAME of PIECE and IT'S DIMENSIONS<br>Top of Chest ¾" x 12" x 18"<br>Side of Chest ¾" x 10" x 18" | | | | | |
|---|---|---|---|---|---|---|
| | DATES | | | | | |
| 1. Select and plane FACE SIDE only enough to make it true. Place a FACE MARK. | Sept. 14 | Sept. 16 | | | | |
| 2. Select and plane FACE EDGE only enough to make it true and square with FACE SIDE. Place a FACE MARK. | Sept. 14 | | | | | |
| 3. Select FACE END. Cut CHAMFER on waste edge. Plane FACE END only to make it square to FACE SIDE and FACE EDGE. FACE MARK. | Sept. 15 | | | | | |
| 4. Measure to length from the FACE END. Saw outside of line, plane end, square to FACE SIDE and FACE EDGE and down to the line. Leave the line. | Sept. 15 | | | | | |
| 5. Measure to width from the FACE EDGE. Plane waste edge square to FACE SIDE and down to the line. Leave the line. | Sept. 15 | | | | | |
| 6. Measure to thickness from FACE SIDE and on all edges and ends. Plane to the line. | Sept. 16 | | | | | |

Fig. 2

The student's progress sheet in squaring stock, shown in Figure 2, is suggested as a compromise. It gives very briefly the steps, and provides a check system so that the student does not have to worry about doing the right operation at the right time. The chart also gives the teacher a chance to estimate student progress on his project.

It is suggested that the exact finished dimensions for each piece in a project be entered at the top of the vertical columns with the name of the piece such as, *Top of Chest*, ¾ by 12 by 18 in.

The student then proceeds to do step number one and to record his own progress with the proper date of completion in each square. Step two, step three, etc., then follow.

We have used this method for a number of years with varying degrees of success depending on how consistent we were in enforcing its use as a student aid.

People work best when they know exactly what is expected of them. By helping to eliminate the confusion that so often exists in the student's mind relative to this elementary job we effect a compromise that helps him through.

(Continued on page 19A)

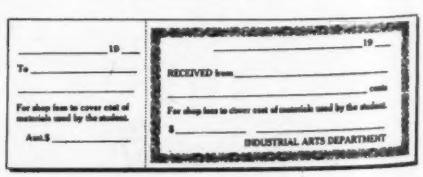



Fig. 3

(Continued from page 16A)

### A Money Receipt for Shop Classes

Parents are likely to be more willing to pay shop fees when they know what the money sent to school with the child is to be used for.

A self-explanatory receipt blank that tells the exact amount needed and how it is to be spent may often facilitate the collection of these fees.

It has been found a good plan to fill in the blank, with the exception of the signature, and to send the slip home with the boy. It is seldom that any other reminder is necessary. When the receipt with the money is brought in, it is signed, returned to the student, and the stub placed on file.

A blank, similar to the one shown in Figure 3, may be duplicated on the duplicator, or it may be produced in the school print shop.

## THE HOME WORKSHOP PROGRAM AS A HOBBY

GARROTT BARICH
Air Corps Technical School
Chanute Field
Thomasboro, Ill.

One of the most apparent objectives or purposes of education and life itself is to learn how to live successfully. That means:

1. That one must make life physically possible by such compensated or paid effort as will provide the necessities of physical existence and comfort for the individual and for those dependent on him; and,

2. That everyone also should seek to find opportunity to use his human capabilities, special talents, or bents to enrich and broaden his life in nonmaterial ways and fashions. This he should do both for his own individual satisfaction and for the good of his kind.

One of these purposes of life and education then, is to teach the student how to work, and the other is to help him develop leisure or hobby interests. It is the leisure or hobby side of life with which this article is concerned. Industrial-arts teachers are inclined to emphasize the work idea, and all too frequently overlook or disregard the hobby phase of their subject. A hobby or leisure activity may be defined as anything we like to do to the exclusion of all other things, and from which we do not look for a reward of any kind except unalloyed pleasure, enjoyment, and satisfaction. A hobby, one might say, is a way of letting off excess energy. Hobbies may be divided into three distinct groups, those that include doing things, those that involve the making of things, and finally, those that take in the collecting of things. Outdoor hobbies include the playing of baseball, boating, swimming, camping, fishing, hunting, archery, etc. Indoor hobbies embrace card playing, checkers, drawing, music, painting, making scrapbooks, wood carving, model airplanes, radio, taxidermy, art-metal work, furniture construction, and the like. The home workshop, therefore, assumes importance because quite a number of the indoor activities mentioned can and should be carried on in the workshop of the home. Teachers of industrial arts should, therefore, encourage the home-workshop program as much as possible. The reason for this becomes still more apparent when one studies the increased leisure which the modern worker enjoys.

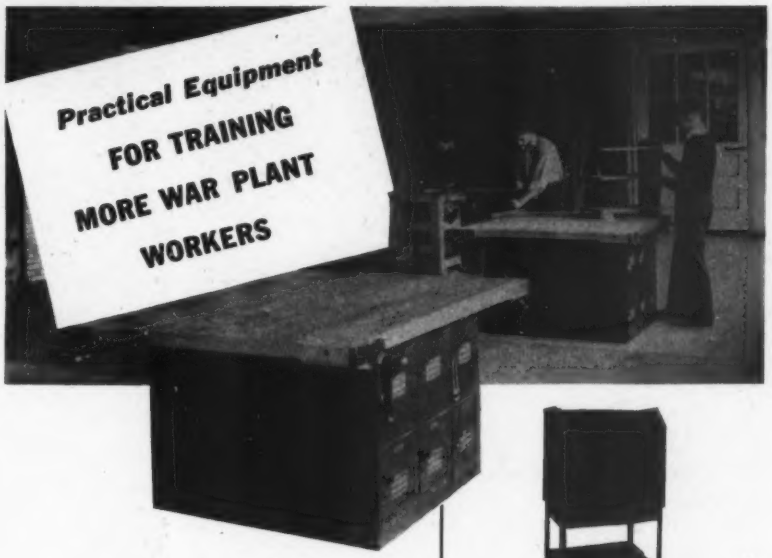
In 1841 a weaver in Massachusetts worked 84 hours per week. In 1870 this was cut to 66 hours. In 1900 the weekly working time was still farther reduced to 58 hours. Then in 1924 the length of the working week was made 48 hours, and in 1937, 40 hours.

Leisure time was lengthened by 44 hours per week since 1841, by 18 hours per week since 1900, and there is nothing to indicate it will not continue to increase.

Up until approximately a year ago a certain mining company was using locomotives to haul iron ore out of the open pits on the Mesabi Range of northern Minnesota. Three men constituted a train crew, consisting of the engineer, fireman, and brakeman. It took five men to keep a steam shovel operating profitably, and no less than 30 men to keep the railroad beds in usable condition. At present seven Diesel trucks, each having a capacity of close to 20 tons, have been purchased. A number of electric shovels also have been provided. A highway has been laid to the ore beds permitting the use of the huge trucks mentioned. One man operates a truck and three men, including an operator, an oiler, and a pitman make up a shovel crew. The old track gang has dwindled to one or two men who service the highway. The other

(Continued on next page)

Practical Equipment FOR TRAINING MORE WAR PLANT WORKERS



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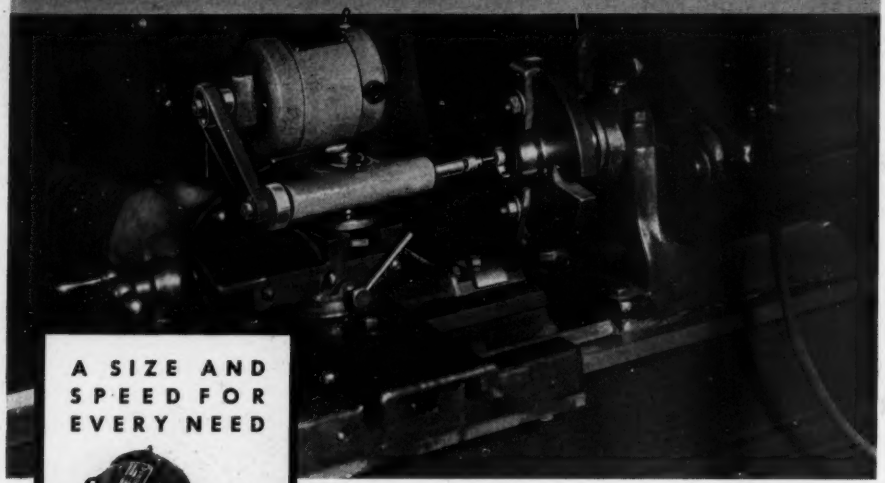
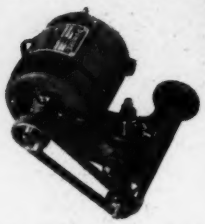


A SIZE AND SPEED FOR EVERY NEED



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Every day precision grinding gains new importance in industry. With this growth comes the demand for highly specialized operators. Industrial schools can use Dumore Grinders to train men in their shop to be ready to meet grinding problems they'll face when they get into the "battle of production." Dumore Grinders can be mounted on a lathe, planer, shaper, milling machine or other machine tool, offering wide-range experience to the student.

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THE DUMORE CO., Dept. 232-D, Racine, Wis.

Dumore PRECISION Grinders


(Continued from previous page)

laborers, who for the most part were comparatively young men, are now sharing their working time with the men on the present truck and shovel crews so that the leisure of all has practically doubled. Hundreds of other similar examples might be mentioned.

The problem of crime should also be considered as an inducement to encourage the home-workshop activity. J. Edgar Hoover says, "It seems inconceivable that in a country as advanced as America each setting sun should look down upon a daily toll of some 36 lives taken at the hands of the underworld. Likewise, it seems inconceivable that in such a nation there were as many as 1,333,000 major crimes committed within a year's time resulting in a crime bill of 15 billion dollars. This amounts to an annual bill of $120 for each man, woman, and child in America." The average age of a criminal is 19 years — an age at which so many of them are still in the sphere of the school's influence. Assuming that an idle brain is the devil's workshop, we can alleviate the situation, to some extent at least, by keeping the boys out of poolrooms, taverns, and other undesirable places by encouraging such a worth-while activity as provided by the home-workshop setup.

The following suggestions show what industrial-arts teachers may do to popularize the home shop.

1. Assist the boy in the intelligent selection and purchase of home-workshop equipment, materials, and tools.

2. Encourage those boys who cannot afford to buy the commercially manufactured machinery and tools to make their own. This includes lathes and lathe tools; band, jig, and circular saws; workbenches; woodworker's and machinist's vises; drill presses; bench grinders; sharpers, and the like.

3. Take some time during the course of the year to discuss the layout of a home workshop, the setting up of machines, the power hookup, the construction of tool cabinets, tool racks, and the putting up of shelving for supplies. Lighting and ventilation should also receive attention as well as safety factors and precautions which operators of home workshops should observe. Secure illustrations, if possible, to aid in presenting this material more vividly.

4. Last, but not least, encourage the formation of home-workshop clubs. This is probably the most successful and most interesting way in which to carry on home-workshop activities. The ideal setup would be to have the club meet in a school shop or some public recreation center, but because neither of these places may be available, it may be necessary to meet in the home workshops of the various members.

The interchange of ideas is, of course, the most valuable outcome of these clubs. One member of one of these clubs, for instance, was well informed on pewter work; another was handy in engraving wood and metal; another gave a practical demonstration of photography, including the use of artificial lighting and working with lights and shadows at one of the meetings. Another member knew quite a bit about telescopes and how to construct them at home. Field trips were taken occasionally and some time was devoted to construction of toys for distribution during the Christmas season. Other activities, too numerous to mention, were carried on. One fellow exhibited his work at the National Home Workshop Show and won a $100 prize. This, of course, is not the purpose of the club. Nevertheless, it will give some idea of what can be done by such an organization.

There are many other ways in which the industrial-arts teacher can interest his students in the home-workshop program. Other shop teachers may have more suggestions to make, but whatever is done in attaining this end will certainly be worth while, and the teacher and school will be well repaid for their efforts.

## Questions and Answers

### GRAY FINISHED TRIM AND FURNITURE

1080. Q.: We are planning to remodel our high school library. It has red oak trim finished in golden oak color. We would like very much to use some type of a gray finish on our new oak furniture and would appreciate suggestions as to type of stain to use and also how we might refinish or touch up the oak trim to get the gray effect on it also. — *J. H. D.*

A.: Strip the building trim of red oak with varnish remover, steel wool, and alcohol. Be thorough in the use of the final alcohol wash and rags to be sure that all traces of finish and wax in the remover are completely eliminated. Let dry overnight.

Make up a colored filler by using five pounds

(Continued on page 22A)

# *How Carborundum can help*

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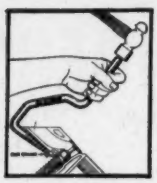
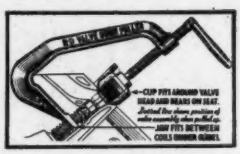
# THE RIGHT K-D TOOL
Does the job Easier, Faster!

## K-D 920 VALVE GUIDE PULLER SET
(Consists of 917 Retainer Driver and 918 Guide Puller)



Pulls "frozen" guide assemblies from—
**Ford V-8-85**
**Lincoln-Zephyr**
**Mercury • Ford 4 Cyl.**
**Ford Tractor**



This safe, fast outfit is correctly designed and strongly made to pull valve guide assemblies from all Ford-built motors, no matter how tightly they may be stuck. The No. 917 engages in the hole in the guide retainer (cut on left) which a few hammer blows quickly removes. The No. 918 Jaw rests under the guide and the cup on the block around the valve head (cut on right). Turning the screw handle pulls the whole assembly straight up and out without damage, danger, or delay.



## ADAPTOR FOR 920 SET TO SERVICE FORD 6 CYL.
Because the valve heads in a Ford 6 Cyl. motor are not the same as in other Ford-built motors this Adaptor, K-D No. 923, must be used with the K-D 918 above. It is not a part of the 920 set.

## K-D 925 VALVE GUIDE REPLACING TOOL
After reconditioning, the assembly is dropped back into the guide bore. Guides must now be pulled down to permit the installation of the guide retainer. In some Ford motors (Tractor, 4 Cyl., 6 Cyl., and Lincoln-Zephyr) a bar-type lifter cannot be used at all because there is no place to "heel," and for this reason K-D designed the No. 925. The tool is engaged on one of the head studs with the jaw in the groove at the bottom of the guides. A downward pressure on the handle pulls the guides down. *It is not to be used for prying down "frozen" guides, however.* Handle length is adjustable to working conditions.

★ ★ ★ *Write for K-D's Catalog No. 21, just off the press. It shows these and over 60 more K-D Tools.* ★ ★ ★

# K-D TOOLS
Sold by Automotive Jobbers everywhere
FACTORY, LANCASTER, PA.


(Continued from page 20A)

of natural silex filler base per gallon of thinner, made from one gallon of pure gum turpentine and two gallons of ethyl-free gasoline. To each gallon of mixed thinned filler, add one quart of French gray, pearl gray, or silver gray wall paint. Stir well, then add one quart of DuPont Penetrating Wood Finish. This makes up the complete formula for the silver gray finish on the wood. Apply the filler, let dry five minutes, then rub off clean with 12-in. squares of cut burlap bagging, wipe clean and bright with clean rags and even up the tone as gray as may be desired. Let dry 24 hours. Apply a brush, or rag wipe coat of DuPont Penetrating Wood Finish (clear), let dry 30 to 45 minutes, then steel wool it off as clean as may be desired, and wipe clean. Let dry overnight. Apply a second coat of clear finish, let set 15 minutes, then wipe clean. Let dry overnight, wax, polish with 2/0 steel wool and wax combined into a pad, let dry 30 minutes and then power or hand buff to a bright finish with sheep-wool pad or rags. A flexible shaft with sheep-wool pad head would be the best method of handling both the trim and furniture polishing for this job.

The final finish has a soft glow, is extremely tough and durable, is almost impossible to scratch unless actually cut, can be kept clean with soap and water and can be waxed and polished to its original gloss at any time. Best of all it is a finish easily applied by anyone who can read and follow directions intelligently.

The methods of finishing the unstained oak furniture will be identical with those for the trim, starting with the filling of the wood. Worn places on the furniture can be sanded clean and smooth each year, touched up with some of the leftover filler and wood finish, then dried and waxed as good as new, all without very much fuss or bother. This is the only finish of which this is true. — *Ralph Waring.*

# New Publications

**Mechanical Drawing 1 and 2**

By Edward F. Berg. Book 1, paper covered, 104 pages, illustrated. Price, 64 cents. Book 2, paper covered, 78 pages, illustrated. Price, 56 cents. Published by The Bruce Publishing Co., Milwaukee, Wis.

This book is written by a veteran teacher of drafting. His outline is based on a curriculum study made by a committee of drafting teachers.

The first book consists of 11 units, each of which consists of several problems, one of which is the "example problem" of the group.

The second book contains 4 units. The first one of these is on pattern development. The second is devoted to pictorial drawing. The third presents the principles of architectural drawing, and the fourth is on machine drawing.

There are many excellent and useful tables presented in the two books which will be of great use to the student.

The two books make a comprehensive course on mechanical drawing for students on the secondary school level.

**Art for the Schools of America**

By Harold Gregg. Cloth, 191 pages, illustrated. Published by International Textbook Co., Scranton, Pa.

This book on art in the elementary school is to give children an appreciation of beauty and an opportunity to develop their own powers of expressing themselves in various art mediums.

The book was written, not so much for the little pupils who are to study art, but for the teachers who are to lead the children into the realms of artistic expression.

For this reason one part of the book has been developed into a teacher's handbook, in which work with the various types of art mediums are described.

One part of the book treats of planning an art course, and in the other the integration of subject matter is discussed.

**The Graphic Arts**

By William H. Johnson and Louis F. Newkirk. Paper, 160 pages, 8½ by 11 in. Price, $1.32. The Macmillan Co., New York, N. Y.

This is a textbook for use in the industrial-arts courses in junior and senior high schools. It is well illustrated and includes excellent descriptive chapters on graphic arts in modern industry; using type; the platen press; some methods of making type; high-speed presses; making linoleum engravings; woodcuts, engravings, etchings; photoengraving, rotogravure, lithography; silk-screen printing; estimating and cutting paper stock; small duplicators; bookmaking; making a book of several signatures; papermaking; photography; and developing and printing. An index is also included in the book.

**Blueprint Reading, Checking, Testing (in 2 parts)**

By Otto A. Steinike. Part I, 59 pages, 5¼ by 8¼ in., paper covered. Price, $1.20. Part II, paper, 39 plates, 7¾ by 10¼ in. Price, 80 cents. Published by McKnight & McKnight, Bloomington, Ill.

Part I contains the instructions and questions which are based on the blueprints in Part II. The student in Part II places his findings in the form of dimensions on the blueprints. Part II, therefore, is consumable while Part I may be used over many times.

A number of tables have been added to Part I. These will be found useful in answering some of the questions which form part of every lesson.

The blueprinted projects represent a fine collection from various fields of drawing and engineering.

(Continued on page 25A)

# *Today's Call is for* FASTER TECHNICAL TRAINING

## *Instructional Speed* PLUS *EFFICIENCY with* STANDARD TEST and DISTRIBUTION PANELS

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"Standard Makes Every Minute Count"

THE STANDARD ELECTRIC TIME COMPANY

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(Continued from page 22A)

**Art-Metal Work**

By Emil F. Kronquist. Cloth, 204 pages. Price, $2.75. Published by McGraw-Hill Book Co., Inc., New York City.

An excellent book by an excellent teacher and craftsman. The book is well illustrated. There are numerous projects each of which is shown in a perspective sketch on the right-hand page while the step-by-step directions, as well as the description of the required material, are given on the left-hand page. There are about 500 of these work sketches in the book.

**Vocational and Professional Monographs**

By Royal Bailey Farnum, art director and executive vice-president of the Rhode Island School of Design, Providence, R. I. Published by the Bellman Publishing Co., Inc., 6 Park St., Boston, Mass. Price, 50 cents.

## *News Notes*

♦ JOHN W. STUDEBAKER, United States Commissioner of Education, reported to Federal Security Administrator Paul V. McNutt that the nation's vocational defense training program completed 17 months of operation on November 30 with a total of 1,776,000 persons who have completed training or are now in training in five types of courses.

During World War I, 61,000 persons were trained for war industries. This is less than 4 per cent of the total trained up to November 30 for this war.

♦ Approximately 800 men from the Philadelphia area are attending an "industrial college" in the Westinghouse South Philadelphia (Pa.) works to learn how to produce vital marine equipment. More than 350 graduates from this training course are already at work as full-fledged machine operators in the big plant.

Enlargement of this program to train 1000 additional men for a new merchant ship equipment plant being built by Westinghouse in Lester, Pa., was announced recently by J. G. Morgan, manager of industrial relations. More than 200 new student-employees already are being trained by the company in vocational and high schools of Philadelphia and Delaware County, Pa.

This intensive program is turning out competent machine operators in from four to ten months, depending upon previous experience and aptitude of the students.

Men with no experience in this type of manufacturing have been put to work on precision jobs after only eight months of training. Others who were employed in the South Philadelphia works as helpers and assistants have been advanced to regular machine operation after only four or six months' instruction.

The training course has been made flexible to handle different types of men. Some who have had vocational training or manufacturing experience are advanced more rapidly than men who have had no previous training.

♦ United States Steel Corporation's educational films, depicting the making of steel, were viewed by approximately three million persons during 1941. This represented an increase of 16 per cent over 1940. The films were projected 30,000 times. The increase is attributed to public interest in steel as a vital product in the American war program.

U. S. Steel films also are being widely used by national defense training classes in arsenals, colleges, and industrial plants as visual aids in fitting trainees for national defense jobs.

U. S. Steel films are available through distribution centers located in company offices in New York, Pittsburgh, Chicago, Cleveland, Birmingham, and San Francisco.

## *Personal News*

**ASSUMED ADDED DUTIES**

Ray F. Kuns, while retaining the title of principal of the Automotive High School, which embraces both the automotive and the aviation divisions, has been relieved from active duty in

Ray F. Kuns

that capacity, to function as supervisor and coordinator in charge of national defense training in the Cincinnati public schools during this emergency.

Roy E. Cahill is in charge of the original Automotive High School as active assistant principal.

Frank M. Fairchild holds a similar position at the Aviation High School.

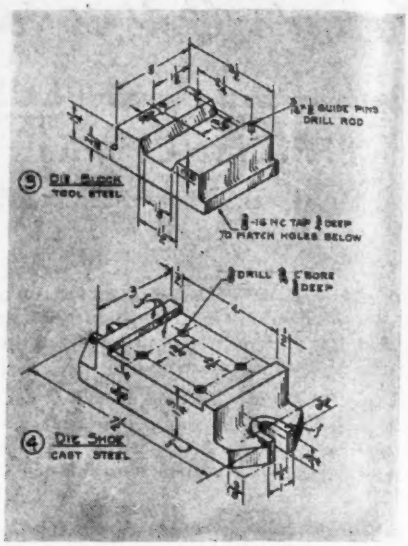
(Continued on next page)

# PROJECT FOR YOUNG AMERICAN DESIGNERS

## No. 2

**This is the second in Dixon's new project, "A Simple Punch and Die." The problem is to prepare correct orthographic views.***

**But the problem is even greater. It is to teach pupils to make the accurate, careful type of detail drawing from which crystal-clear blueprints can be made. Such work calls for the smooth, opaque line drawn by a *Typhonite* Eldorado Pencil . . . a great advantage to students where the teacher wishes to build early pride in faultless work. Specify *Typhonite* Eldorado Pencils.**




(*A free blueprint of the correct orthographic views of the Die Block and Die Shoe will be sent without charge if you will write to the address below *within 30 days*, asking for Blueprint No. 128-J4.)

*Next Month* Dixon will present the third drawing of the project in this space. The first appeared last month.

SCHOOL BUREAU
JOSEPH DIXON CRUCIBLE CO.
JERSEY CITY, N. J.


(Continued from previous page)

**RECEIVES COMMISSION AS LIEUTENANT COLONEL**

DR. VERNE C. FRYKLUND, associate professor of industrial education, University of Minnesota, Minneapolis, Minn., has been commissioned Lt.

Lt. Col. Verne C. Fryklund

Col. of the armored force of the U. S. Army. He has been made director of a new department of teacher training and will be stationed at Fort Knox, Ky.

♦ To correct errors which were incorporated in the statement on DR. BURL N. OSBURN in the last issue, we want to state briefly that Dr. Osburn has been appointed director of the industrial-arts department at State Teachers College, Millersville, Pa. He has been on the staff of that institution since 1932.

He also has been on the Ohio State University summer session staff since 1931.

**APPOINTED TO NEW POSITION**

HARRY W. PAINE, formerly director of vocational teacher improvement service, N.W. Ohio, University of Toledo, Toledo, Ohio, has been appointed as director of vocational teacher improvement service for S.W. Ohio, and as professor of vocational education at Teachers College, at the University of Cincinnati, Cincinnati, Ohio.

Harry W. Paine

♦ C. A. FELKER, formerly personnel director, Marion Steam Shovel Co., Marion, Ohio, has been appointed as assistant to T. F. GIBSON, director of vocational teacher improvement service, N.W. Ohio, University of Toledo, Toledo, Ohio.

♦ W. J. JONES, formerly at Pennsylvania Industrial School, has been appointed as supervisor in charge of teaching methods in the engineering, science, and management of the defense training program at the Pennsylvania State College, State College, Pa.

♦ RUSSEL E. ANDERSON, graduate of The Stout Institute, Menomonie, Wis., has just received his commission as ensign in the U. S. Navy. He is taking a special Diesel engineering course at Lehigh University.

♦ DEAN KNOLL, senior student at State Teachers College, Mankato, Minn., has been granted a special emergency permit by the department of education, Minnesota, to teach at Walnut Grove, Minn.

♦ HARRY W. KROLL, who has been placement director of the Rockford public schools for the past two years, has been appointed assistant principal of the East Senior High School, Rockford public schools, Rockford, Ill.

♦ LUVERNE AURET, senior student at State Teachers College, Mankato, Minn., has received a special emergency permit from the Minnesota State Department of Education to teach at Hayfield, Minn.

♦ EARL MORRISON, graduate of The Stout Institute, Menomonie, Wis., has been commissioned ensign in the U. S. Navy.

♦ RAY CHRISTMAN, graduate of The Stout Institute, Menomonie, Wis., has been commissioned ensign in the U. S. Navy.

♦ SAM MUNSON, formerly teacher at Winston-Salem, N. C., has joined the staff of Central High School, Sheboygan, Wis.

---

We must do other things than issue priority ratings in order to solve the problems which shortages bring. We must find some means of adjusting our lives to the defense effort.—*Donald M. Nelson*, Executive Director, Supply Priorities and Allocations Board.

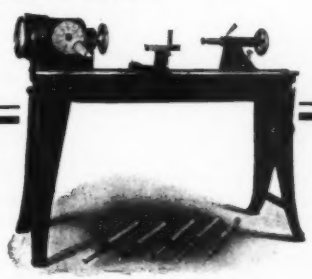
## Two Spurs with But a Single Track!

ONE spur "tracks" the other, in the Russell Jennings Auger Bit, because both are equidistant from the screw, or center of the bit. And the circle is always the exact diameter marked on the tang. Here at the Jennings factory, every key man is a "hound" for accuracy! Remember that, please, when you buy bits for your classes. Catalog on request.

**Russell Jennings** The RUSSELL JENNINGS MFG. CO., Chester, Conn.

**AUGER BITS**

# "OLIVER" *Metal Spinning* LATHE



*The New Lathe for progressive shops*

Instructors in busy shops find this new Lathe a most useful and valuable addition to their equipment. Students quickly learn to spin practical projects of surprising beauty from pewter, aluminum, bronze, etc. Its smooth flow of power spins 20-gauge steel with ease. Has heavy bed, extra large bearings, live tail center. Ball bearing motor-driven headstock adjustable 800 to 2400 RPM. And for turning wood there isn't a lathe that can beat it.

*Write for Complete Details*

**OLIVER MACHINERY COMPANY, GRAND RAPIDS, MICHIGAN**

# MEN WANTED!

## *The Sign of the Times*

★ ★

# "YANKEE"

## *The Tools of the Day*

No. 2150 "YANKEE" BIT EXTENSION
No. 308 "YANKEE" SPIRAL RATCHET SCREW DRIVER
No. 10 "YANKEE" RATCHET SCREW DRIVER
No. 15 "YANKEE" RATCHET SCREW DRIVER
No. 2100 "YANKEE" RATCHET BRACE
No. 1545 "YANKEE" RATCHET HAND DRILL
No. 41 "YANKEE" AUTOMATIC DRILL
No. 990 "YANKEE" VISE

***Men wanted*** **is the sign of the times — with *skilled* men the vital need. Education, training, production — even the light of day — have been asked to enlist every ounce of energy in a common cause.**

**As "Yankee" Tools speed production for industrial America in its present crisis, so can "Yankee" Tools speed the training of *your* students. Behind the pretested quality that has made these tools famous for nearly half a century is an ingenuity which makes each a time and labor-saving *specialist* at its particular work.**

**Easy teaching leads to quick learning in the field of industrial arts. Teach with "Yankee" Fine Mechanics' Tools and your students will grow up with the tools which grown-ups depend upon.**

★ ***The "Yankee" Tools illustrated above are only a few of those shown and described in "Yankee" Tool Book V-4. Shall we mail you a copy?***

## "YANKEE" TOOLS

make good mechanics better

**NORTH BROS. MFG. CO.**

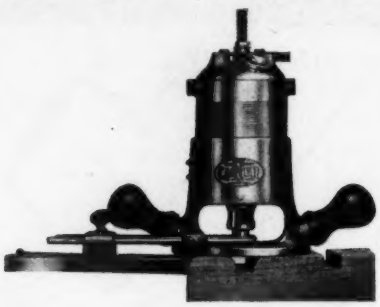
*Established 1880* · PHILADELPHIA, PA., U. S. A.

# Shop Equipment News

## New Products — Publications

### CARTER R4 ROUTER

A versatile motor-driven tool for school woodworking shops, the Carter R4 Router is used for inlay work, to make drop leaf, thumb mold, rabbet, dado, and innumerable molding cuts. It enables students to do a real finishing job on their projects, giving them the professional touch.



R4 Router

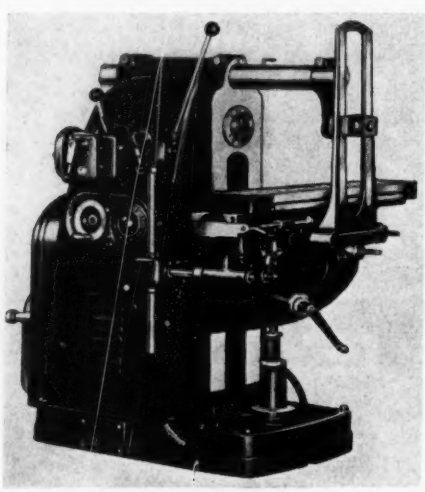
Equipped with an 18,000 r.p.m. ⅓ h.p. universal motor, the R4 Router can be operated from any light socket. It is safe and accurate and the depth adjustment is made by raising or lowering motor unit in router base.

Carter R4 Router comes equipped with chuck for bits, base, straight and circular gauge, and a templet guide. There is a wide variety of Carter Router bits available that increase the usefulness of the tool. Also attachments may be obtained to adapt the R4 Router for shaping, carving, dovetail work, beading, and fluting. The same motor unit furnished with the R4 Router is used with all attachments.

Made by the R. L. Carter Division, The Stanley Works, New Britain, Conn.

### SIMMONS MICRO-MILLER

The No. 1 A Micro-Speed Milling Machine, manufactured by the Simmons Machine Tool Corp., Albany, N. Y., has been designed especially for the rapid production of small parts such as those used in airplane, automotive, and other similar types of manufacturing. The application of the Simmons Micro-Speed Drive Unit gives a very flexible range of speeds to accommodate any class of material or cutting tools.



Simmons Micro-Miller

The column and base are cast in a one-piece casting to give the necessary rigidity under heavy load. The Simmons Micro-Speed Drive Unit is housed in the column and is available in either 2- or 3-phase, 25-, 50-, or 60-cycle, 220-, 400-, 440-, or 550-volt alternating current.

The motor is built integral with the main drive unit and through the variable speed micro unit an unlimited range of selective speeds is obtainable to the spindle. The control is through the selector-dial hand wheel within easy reach of the operator at all times. The spindle is driven through multiple V belts.

The spindle is provided with a No. 40 standardized flanged spindle nose. The spindle runs on Timken precision tapered roller bearings with suitable adjustment from the rear. All shafts in head and feedbox run on antifriction bearings.

The saddle and knee are accurately hand scraped to perfect alignment on long dovetail slides.

The table is provided with adjustable aligning gibs to compensate for wear. Positive automatic longitudinal power feed is supplied to the table and all feeds are provided with adjustable dials graduated to thousandths of an inch.

Standard equipment includes harness, knockout rod, crank handles, wrenches, motor, multiple V-driving belts, magnetic controller with overload and undervoltage protection, and start, stop, and reverse push button station.

### NEW LYON STEEL WORKBENCH

Lyon heavy duty, steel workbenches are given a more diversified use by addition of several new and improved accessories.

The basic steel bench shown may be equipped with single drawer, two- or three-shift drawer

units for multiple shift operations, half-depth shelf, full-depth shelf, back and end stops, foot rest, or full-length bench riser. The channel-type stringer illustrated is used only when bench has no shelf. Shelves and stringer are made in one piece for added strength and rigidity.

Benches and accessories are fully illustrated in the new 40-page catalog No. 331, just released by Lyon Metal Products, Inc., Clark St., Aurora, Ill.

### NEW TEMPERING AND DRAWING FURNACE

The Johnson Gas Appliance Co., 557 E. Ave., N.W., Cedar Rapids, Iowa, has just announced a new addition to their line of industrial furnaces, the No. 820 Tempering and Drawing Furnace.

This furnace speeds up the tempering of tools, dies, small parts, nonferrous castings and parts. It may be used for any work requiring a temperature range from 275 to 1200 deg.

This furnace is compact and requires very little floor space. It is heavily lined with insulating refractory and is equipped with two large Johnson atmospheric burners. The counterbalanced, self-aligning door reduces heat loss to a minimum, and is easily controlled by a crank at the operator's left. The firebox size of the 820 is 16 by 16 by 14 in., and the furnace is equipped with two allegheny metal shelves. Reasonably prompt deliveries can be made.

### SOMETHING NEW FOR THE PRINTER

A valuable tool for the composing room has been developed by the American Type Founders, Elizabeth, N. J., with its latest typographical creation, Alpha-blox. As implied by the name, Alpha-blox are types on whose printing surfaces appear a variety of straight sections, curves, *L's* and *T's*. Set in block-building fashion, these segments form the letters of the alphabet, figures, borders, ornaments, and innumerable other typographic devices.

Alpha-blox are manufactured in two styles—linear and reverse. Cut and cast to register, the two styles may be used interchangeably or for two-color work. Both styles are cast in three even pica sizes: 12, 24, and 36 point.

A descriptive folder showing many of the possible Alpha-blox designs and combinations is obtainable from the American Type Founders, Elizabeth, N. J., or from any one of the company's branch offices.

### VERNON 6-IN. UNIVERSAL INDEX CENTERS

The new 6-in. Vernon stationary type universal index centers are being marketed by Machinery Manufacturing Co., 1915 East St., Vernon, Los Angeles, Calif.

Universal Index Centers

The body castings are very compact, yet rugged enough to support all work within the capacity of the centers.

The head can be positively clamped at any angle from 10 deg. below the horizontal to 10 deg. past the perpendicular. The dial is graduated in degrees.

The worm and worm gear are easily accessible. The ratio is 40:1.

The standard equipment includes three index plates with chart for using same, four hold-down bolts, and four table-slot tongues.

### NEW CATALOG ON EDGE TOOLS

Fayette R. Plumb, Inc., Philadelphia, Pa., and St. Louis, Mo., have issued a new catalog describing and illustrating their hammers, hatchets, adzes, sledges, blacksmith's chisels, mauls, axes, and special files.

### FREE EDUCATIONAL CALENDAR

The 1942 combination calendar and educational course on Machine Tools and Machine-Shop Practice is now available, free of charge, from Continental Machines, Inc., Minneapolis, Minn.

Schools and industries will find the contents of this pictorially illustrated calendar of real help in teaching their students and apprentices. The calendar begins with the month of March, 1942, but carries through for February of 1943.

(Continued on page 31A)

**THE PENNSYLVANIA STATE COLLEGE**

**Summer Program 1942**

**Trade and Industrial and Industrial Arts Education Doctors', Masters', and Baccalaureate Degrees**

**Three summer sessions for in-service teachers, administrators, and other qualified individuals. Courses designed to meet current national problems. Limited number of short unit courses.**

***The Summer Sessions:***

**June 8 to June 26; June 29 to August 7; August 10 to August 28.**

***Upperclass Term:***

**For sophomores, juniors, and seniors — May 18 to August 28.**

***Freshman Term:***

**For entering students — June 8 to August 28.**

***For further information and catalogues address:***

**Director of Summer Sessions**
***Room 104 Burrowes Building***

**The Pennsylvania State College**
**State College, Pennsylvania**

**MINNESOTA**
***Summer Session***

**Department of Industrial Education**
**COLLEGE of EDUCATION**

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*Separate Enrollment for Either or Both Terms*
**June 15 - July 24 or July 27 - August 28**

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**Four-year Curriculum—B.S. Degree**
**Master's Degree — Plans A-B-X-Y**
**Individual Plans for Ph.D.**
**Industrial Arts and**
**Smith-Hughes, George-Deen Courses**
**Excellent Library Facilities**
**Unexcelled Recreational Program**
**Wide Range of Manipulative Courses**

★

**Correspondence concerning credit transfer, graduate status, and advanced programs, should be addressed to the Department of Industrial Education, 200 Eddy Hall. Four-year curriculum and advanced patterns upon request.**

***Bulletins of the Summer Session may be obtained by writing to the Director of Summer Sessions,***

**733 Administration Building**

**UNIVERSITY OF MINNESOTA**
**MINNEAPOLIS ♦ MINNESOTA**

(Continued from page 28A)

The calendar contains 12 comprehensive lessons on metalworking.

Parts of the course are elementary for the benefit of apprentices and learners. New information is given on "Chip Production" for all eleven basic types of machine tools. An illustrated historical reference accompanies each machine-tool study.

The calendar is 40 by 22 in. It has a strong metal binding which prevents all sagging or curling of the pages.

### "FOR GRINDER MEN ONLY"

A 24-page, pocket-size instruction booklet on wheel dressing, entitled "For Grinder Men Only," is available to vocational instructors and their students without charge from the Koebel Diamond Tool Co., 9353 Grinnell Ave., Detroit, Mich.

The booklet is copiously illustrated with pen-and-ink drawings which get the points across in a light, humorous manner.

Following are a few of the chapter headings, which indicate the completeness with which the subject is covered: How Should a Wheel Be Dressed?; Be Sure Spindle Bearings Are Warmed Up; Look Out for Vibration!; Handle Diamond Tools Carefully; Correct Position Is Important; Take Light Cuts; Correct Angle Is Important; Approach Face From the Center; Correct Speed Is Important; Get the Right Number of Pieces.

Available with the booklet, to instructors who request it, is a large poster without advertising matter of any kind, that effectively speaks for care and conservation of all tools.

### NEW FIRST-AID CHART

A new Pressure and Tourniquet Point Chart, which will be helpful in first-aid work, has just been issued by the Clay-Adams Co., 44 East 23rd St., New York City.

This new chart shows the main arterial circulation in red, indicating the digital pressure and tourniquet points on a background of a clearly defined skeleton. The chart conforms to the subject matter now widely used in civilian defense first-aid courses. It is two thirds natural size, so that the subject matter is visible even by a large group of students. The chart is 18 in. wide and 54 in. high, printed on cloth-backed paper with wood rollers top and bottom.

### NEW WELDING MAGAZINE

A new magazine, *The Hobart Arc Welding News*, is now being published by Hobart Brothers Co., Troy, Ohio. This interesting publication will be sent free of charge to anyone writing the firm's Direct Mail Department and asking to be placed on the regular magazine mailing list. Editorial matter is made up from entries in the Hobart Arc Welding News Contest; letters to the editor; and articles by welding experts.

### ANNOUNCING NEW FACTORY BRANCH

The Frederick Post Co. announces the opening of a new factory branch at 1215 Capitol, Houston, Tex.

## *Association News*

### COMING CONVENTIONS

♦ Kentucky State Industrial Arts Association — April 17, at Louisville Hotel, Louisville, Ky. Pres., H. L. Oakley, Lexington Junior High School, Lexington, Ky. Secy., Edgar Mara, Holmes High School, Covington, Ky.

♦ Wisconsin Vocational and Adult Education Association — May 1 and 2, at Madison, Wis. Pres., John A. Jubiak, State Office, Vocational Education, Madison, Wis. Secy., Wm. A. Brazier, Milwaukee Vocational School, 1015 N. 6th St., Milwaukee, Wis.

♦ American Association for Adult Education — May 11 and 12, at the Thayer Hotel, West Point, N. Y. Dir., Morse A. Cartwright, 525 W. 120th St., New York City.

♦ The Michigan Industrial Education Society will hold its 17th annual convention at the Book-Cadillac Hotel, Detroit, Mich., Thursday, April 9, through Saturday, April 11.

Superintendent Frank Cody is honorary chairman, and Earl L. Bedell, director of vocational education, Detroit public schools, is chairman of local arrangements. Carl E. Karlstrom, supervisor of vocational education, Detroit public schools, is president of the society.

The convention theme is "Meeting the Needs of the American Way of Life." Distinguished speakers include Major Norman A. Imrie, humorist and noted newspaperman; Robert Burns, director of research, Science Research Associates, Chicago, Ill.; William H. Johnson, superintendent of schools, Chicago, Ill.; and Charles DeRoy Anspach, president of the Central States Teachers College, Mt. Pleasant, Mich. Other speakers represent local and state industry, labor, and education.

The convention will include visits to industrial plants and school vocational-education shops, and discussion conferences. — *Walter E. Gleason.*

♦ The State of Illinois Board for Vocational Education of Springfield, Ill., has announced a state conference of local supervisors, teacher trainers, and school administrators of Trade and Industrial Education, to be held at the Morrison Hotel in Chicago, Thursday, March 26, 1942. It is the purpose of this conference to answer many questions that concern all those working with the Trade and Industrial Program.

A dinner meeting will be held Thursday evening. — *J. W. Thompson,* State Supervisor of Trade and Industrial Education, Springfield, Ill.

♦ The Industrial Arts Club of the School of Education, New York University, is to hold its seventh annual Industrial Arts Exhibition on

(Continued on next page)

FIRST and FINEST
HANDEE
TOOL OF 1001 USES
Does precision work on metals, alloys, plastics, wood, horn, bone, glass, etc. Original tool of this type and the favorite today.
A WHOLE TOOLSHOP IN ONE HAND
Uses 300 accessories to grind, drill, polish, rout, cut, carve, sand, saw, sharpen, engrave. Plugs in any socket. Wt. 12 oz. 25,000 r.p.m. $18.50 postpaid with 7 Accessories.
EVERY VOCATIONAL SCHOOL NEEDS THIS ULTRA DE LUXE SET
Strong, metal carrying case contains a DeLuxe model Handee and 45 of the most popular and most practical accessories. It's a good idea to begin with this set and then add accessories as needed.
Postpaid, $25.00.
ORDER on 10-DAYS MONEY-BACK TRIAL
FREE—64-page Catalog describes all Handee Products and their wide application in crafts and industry all over the world.
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MACHINISTS
AND TOOL MAKERS HANDY BOOK
JUST OUT!
A READY REFERENCE
Tells How to Operate and Set Up Lathes, Screw and Milling Machines, Shapers, Drill Presses and All Other Machine Tools.
A KEY TO SHOP PRACTICE
In All Branches. For Every Machinist, Toolmaker, Machine Operator, Draughtsman, Metal Worker, Mechanic and Student.
5 PRACTICAL BOOKS IN ONE! 60 FULLY ILLUSTRATED CHAPTERS
Covering 1—Modern Machine Shop Practice. 2—Blue Print Reading and How to Draw. 3—Calculations & Mathematics for Machinists. 4—Shop Physics. 5—How to Use the Slide Rule.
1600 PAGES FULLY ILLUSTRATED
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$4 Get this information for yourself. Mail coupon today. No obligation unless satisfied.
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Mail AUDELS MACHINISTS & TOOLMAKERS HANDY BOOK, Price $4 on 7 Days Free Trial. If O. K. I will remit $1 in 7 days and $1 monthly until $4 is paid. Otherwise I will return it.
Name
Address
Occupation
Reference
VOC

(Continued from previous page)

April 25, 1942, at 34 Stuyvesant St., New York City.

This annual exhibition brings together the work done in school shops as well as that produced in industry.

The exhibition will be free to the public who will be invited to participate.

For information write: Herman D. Post, chairman, Exhibition Committee, 80 Washington Square East, New York City.

♦ The annual election banquet of the Mu Sigma Pi Fraternity was held at the Abington Hotel, in Detroit, on January 24. Dr. Frank Cody, superintendent of schools, served as the toastmaster. Walter F. Gries, commissioner, State Social Welfare Commission, spoke on the subject of "Drill Cores." Donald McGuire, principal of the Post Intermediate School and Frazer Clark, principal of the Tappan Intermediate School, were the

Seated (left to right): C. H. Sechrest, Ernest G. Gardner, Robert Shields. Standing (left to right): O. Rowland Scott, Roy Howard, Fred Brierley

guests of honor. Some of the distinguished members of the fraternity that were present were: Dr. Warren E. Bow, deputy superintendent of schools, Detroit; Dr. Arthur Carr, dean of the college of engineering, Wayne University; Dr. W. E. Lessenger, dean of the college of education, Wayne University; and Frederick E. Searle, superintendent of the Henry Ford Trade School, Dearborn.

Arrangements for the evening were made by Earl O. Phillips, Tappan Intermediate School.

The newly elected officers are: C. H. Sechrest, vice-president; Ernest G. Gardner, president; Robert Shields, recording secretary; O. Rowland Scott, corresponding secretary; and Fred Brierley, treasurer. Roy Howard was elected as a member of the executive board. — G. H. Silvius.

♦ The regular January meeting of the Fairfield County Industrial Arts Association was held on January 29 in the Norwalk, Conn., Senior High School.

Following inspection of the school shops, the men adjourned to the school cafeteria for the evening's program. After a short business meeting, the president, Mr. Wesley Ketcham of Norwalk, introduced his superintendent of schools, Dr. Philip Jakob, who commented briefly on industrial arts in the Norwalk schools and welcomed the group to the high school. Dr. Jakob next introduced Dr. Alonzo G. Grace, state commissioner of education for Connecticut, who spoke on "The Redirection of the Secondary Schools," the need for broadening of the industrial-arts facilities in the state, and briefly, on the aspect of industrial-arts supervision in Connecticut. Dr. Grace announced the continuation of State Curriculum Study Committees of laymen and educators to further the work done last year by five regional committees.

Among the other guests present were Superintendent John Young, of Bridgeport; Dr. Ray-

(Continued on page 35A)

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BUY NOW!
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Wrought Iron
Art Materials
Clays
Archery
Basketry
Beadcraft
Block Printing
Plastics
Felt Craft
Spongex
Weaving
Deco Wood
Jewelry
Etc.
We don't want to be alarmists but the plain facts are these:
The Government has placed defense priorities on many items—such as metals, tools and chemicals—many of which are used in Art, Industrial Art and Vocational Courses. Many of these items are no longer obtainable, others are advancing in price almost daily.
The American Handicrafts Company still has huge stocks available in both New York and Los Angeles. RUSH YOUR ORDERS TO US NOW—while we can still take care of your requirements and before prices advance further. NEXT MONTH OR NEXT TERM MAY BE TOO LATE!
If you do not have a copy of our 80-page illustrated cata ogue, send 10c in stamps or coin and we will rush it to you.
AMERICAN HANDICRAFTS CO.
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"Hold-Heet" GLUE POTS
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And here are the reasons: They're safe, fool-proof, built "like a boiler" to take plenty of shop abuse. Automatic Thermostat controls glue temperature; no burned or spoiled glue; no water jacket troubles; no fire hazards. Teach students modern, safe gluing methods with "Hold-Heet" — used by industry and schools everywhere! 30 DAY FREE TRIAL. Test "Hold-Heet" in your shop. If it is not entirely satisfactory, send it back. Play safe with this superior Electric Glue Pot!
1 qt. $14
2 qt. $17
4 qt. $24
8 qt. $36
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(Continued from page 32A)

mond W. Phipps; Dr. Dunton; and Mr. Thomas Freeman, principal of Bedford Junior High School, Westport; Joseph Jeffrey, principal of Bassick High School, Bridgeport; and Earle Wilson, principal of Rogers Junior High School of Stamford.

Announcement was made that the Spring Convention of the Connecticut Industrial Arts Association would be held at the Teachers College of Connecticut in New Britain, on March 13 and 14.— Benjamin Isenberg.

♦ The Tenth Annual Pennsylvania Industrial Arts Conference will be held at the State Teachers College, California, Pa., on Friday and Saturday, April 24 and 25, 1942. Dr. Francis B. Haas, state superintendent of public instruction, will speak at the conference. Dr. William E. Warner, professor of education at Ohio State University, Columbus, Ohio, will be the guest speaker at the luncheon meeting to be held Saturday noon in the college dining hall. Also on the program will be James H. Gheen, a humorous speaker and lecturer. There will be a morning and afternoon session of speaking and discussion. Plans are being made to make the program entertaining as well as instructive to all those interested in industrial-arts education.

All of the shops at the college are to be in operation so that visitors may see students carrying on the work of regular classes for the preparation of teachers of industrial arts. Numerous commercial exhibits will be on display together with a large amount of industrial-arts material from high schools throughout the district served by the college.

Since the shops at California are being used in the National Defense Training Program for the training of men to take positions in war industries, a large exhibit will be given over to the work done by the men in these classes.

Another feature of this year's conference will be the model-aircraft project exhibit. Since California is aiding in the national defense drive for model planes, an entire new shop has been set up, and this shop will show the steps and operations used in making the planes.

Arrangements for the conference are being formulated by a cabinet of industrial-arts students and instructors with Dr. S. L. Coover, director of industrial-arts education at California, as the general chairman. — *Donald Maley*, Student Publicity Director.

♦ The 1942 Convention of the Western Arts Association will be held in Kansas City, Mo., April 8–11, 1942. The convention theme, around which a strong program is being built, is "Art in the America of Tomorrow." The headquarters hotels are the Muehlbach and the Philips. The meetings will be held in the Municipal Auditorium. For additional information write to Joseph K. Botz, secretary, Franklin, Mich.

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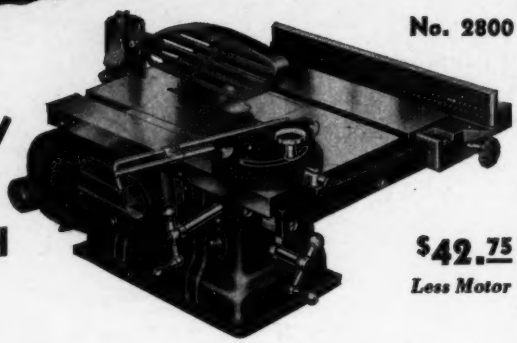

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